design for
freedom
grace farms

International Guidance & Toolkit

98–137 Toolkit

28 million people around the world are held in forced labor conditions. Many of them extract the materials that go into our homes, schools, office buildings, and landscapes.

Design for Freedom was launched to raise awareness of this egregious human rights violation and initialize institutional responses to eliminate forced labor from the building materials supply chain.

In 2022, the Design for Freedom Toolkit was published to provide tools and research that practitioners can use to integrate ethical sourcing strategies into their practices.

This Design for Freedom International Guidance & Toolkit builds on this work. Through this Guidance & Toolkit, we can all design and build a more humane future together.

Section 1 Guidance

We all have agency to Design for Freedom

Every building tells a story of humanity - either of dignity or exploitation.

28 million people are held in forced labor conditions on any given day. Many of them work in inhumane conditions to extract and produce the materials that go into our buildings and landscapes. Their suffering is embedded into construction projects worldwide.

By 2030, global spending in construction is expected to reach $17.5 trillion, with China, the U.S., and India leading the way and accounting for 57% of all global growth. More than 60% of the global infrastructure investment will be in emerging economies, particularly Asia, while the U.S. and Canada will contribute almost 20%.[i]

Rapid urbanization, the growing demand for infrastructure that can respond to climate change, and the development of new technologies that can shape the cities of the future are increasing the urgency to address forced labor within the building materials supply chain. At the same time, we are now presented with a tremendous opportunity to move the needle to make progress and advance human rights.

We can no longer subsidize the construction industry with modern slavery. We can no longer accept the slavery or exploitation discount. Design for Freedom calls upon the entire ecosystem to harness the power of the built environment to uphold and support human rights and remove forced labor from the building materials supply chain.

We ask you to commit to Design for Freedom's three principles:

- **Find and Address Embedded Forced Labor: so that you do not continue to profit from the slavery or exploitation discount.**
- **Pursue Ethical Decarbonization: so that we deliver a just transition which does not erode human rights.**
- **Prioritize Circularity: to truncate supply chains and reduce the risk of exploitation.**

We ask you to fully recognize and assume your capacity at whichever point in the system that you hold the most leverage, whether it be large or small. Time is of the essence, especially in relation to United Nations Sustainable Development Goal 8.7 (UN SDG 8.7) where work is focused upon ending forced and child labor, modern slavery, and human trafficking by 2030.

In this Guidance & Toolkit you will gain insights and take inspiration from international leaders and experts working in all parts of the built environment. The Toolkit has been updated with new tools including contract language, self-assessment questionnaires, and supply chain risk technology platforms. You will also find added rigor and alignment with existing global frameworks such as the UN Guiding Principles on Business and Human Rights[ii] and the Organization for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises.[iii]

Use this Guidance & Toolkit to elevate internal dialogue, get high-level buy-in, and identify your own areas of risk. These will be the points at which you have the potential to make significant change. The compounding effect promises to be immense.

i "OECD Global Spending in Construction to Reach $17.5 Trillion by 2030, Finds Frost & Sullivan." Frost & Sullivan, 2019.
ii "Guiding Principles on Business and Human Rights: Implementing the United Nations 'Protect, Respect and Remedy' Framework." Office of the United Nations High Commissioner for Human Rights, United Nations, 2012.
iii "OECD Guidelines for Multinational Enterprises on Responsible Business Conduct."

"There is real momentum and desire behind the drive for change in the ways in which supply chains operate across the globe. Legislation is helping to focus minds on the subject but we also need practical advice and informed support. The creation of The Design for Freedom International Guidance & Toolkit is part of that forward movement responding as it does to the challenge of engaging the construction sector in meaningful dialogue, which will contribute to helping the move away from these abhorrent practices. Recently awareness of labour exploitation on construction sites has grown. However, labour abuses on building sites are only part of the story: sickening examples of forced labour in supply chains involving children, women, and men are frequent and pervasive.

Awareness is an important first step towards the eradication of forced labour from supply chains and there remains much hard work to be done if we're to transform the way the construction industry goes about its business."

The Right Honourable The Baroness Young of Hornsey OBE

Executive Summary

Design for Freedom is the global movement, led by Grace Farms, to eliminate forced and child labor from the building materials supply chain. Globally, 28 million people are held in conditions of forced labor. Together with industry leaders, Grace Farms is addressing this human rights violation and creating a radical paradigm shift to design and build a more humane future for all.

The Design for Freedom International Guidance & Toolkit provides resources and information professionals can use to prioritize ethical supply chains and integrate Design for Freedom Principles. With contributions from more than a dozen leading international experts, this Guidance shines a light on the critical issues related to forced labor in the building materials supply chain, including the legal landscape, the importance of compliance, the growing issue of prison labor, and the role insurers and investors can play to ensure that our building materials are not embedded with forced or child labor.

It also provides information on 12 raw and composite materials that are at high risk of forced and child labor. These materials, which include glass, concrete, steel, and bricks, are some of the most commonly used in the built environment today. They are often extracted and produced in brutal and inhumane conditions in countries throughout the world. By better understanding the supply chains of these materials and using the relevant tools presented here, design and construction professionals can prioritize human rights and ethical procurement, while at the same time meeting health and climate project goals.

The Guidance is built upon the three Design for Freedom Principles:

Find and Address Embedded Forced Labor

- To no longer profit from the slavery or exploitation discount.
- Know your risks back to raw materials, work in collaboration to address forced labor, promote transparency and the decent work agenda.

Pursue Ethical Decarbonization

- To deliver a just transition which upholds human rights.
- Analyze decarbonization plans and product development through a human rights lens.

Prioritize Circularity

- To truncate supply chains to reduce risk of exploitation. Standardize and document the use of salvaged, upcycled, reclaimed, and innovative products, and challenge existing business models.

These Principles are a call to action.

Without undertaking appropriate human rights due diligence in our global supply chains, there will continue to be a lack of knowledge, human rights abuses, lack of accountability, and no reduction in the number of people in situations of forced labor.

This work requires all of us – architects, engineers, consumers, suppliers, manufacturers, developers, investors, insurers, designers, and contractors – to play our part, demand accountability, and take shared responsibility for ensuring our building materials are made without forced labor.

Sharon Prince and Prince Zeid Ra'ad Al Hussein at the First Design for Freedom Summit in 2022.

Design for Freedom
Mission and Principles

Creating a global movement demands a strong foundation that all stakeholders can instantly understand, align with, and embrace. Our collective mission is unequivocal.

Our Mission

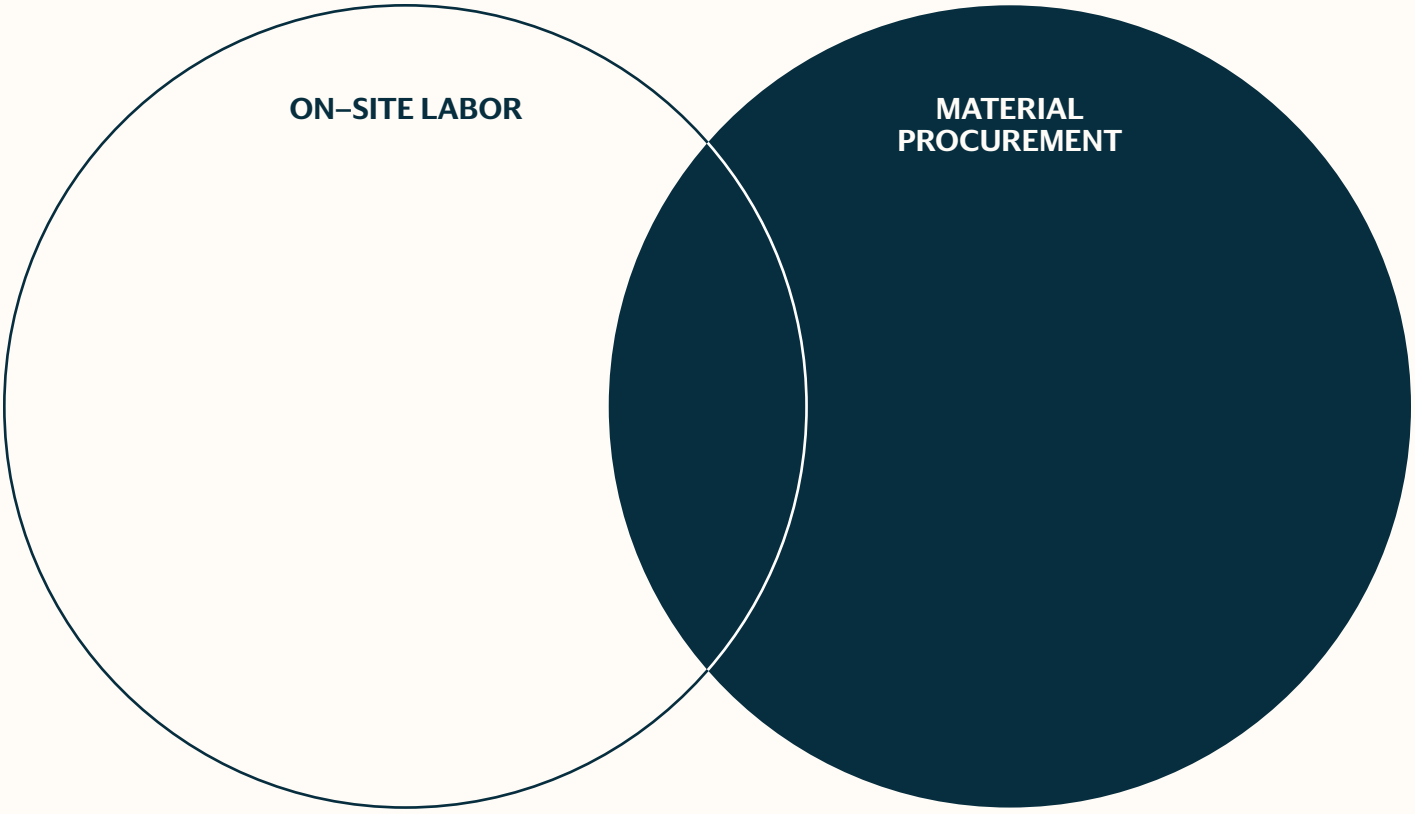
Harness the power of the built environment to uphold and support human rights and remove forced and child labor from the building materials supply chain.

PRINCIPLES	1. Find and Address Embedded Forced Labor	2. Pursue Ethical Decarbonization	3. Prioritize Circularity
WHY?	To no longer profit from the slavery or exploitation discount.	To deliver a just transition which upholds human rights.	To truncate supply chains to reduce risk of exploitation.
HOW?	Know your risks back to raw materials, work in collaboration to address forced labor, promote transparency and the decent work agenda.	Analyze decarbonization plans and product development through a human rights lens.	Standardize and document the use of salvaged, upcycled, reclaimed, and innovative products, and challenge existing business models.

"Are our buildings ethically sourced, without forced labor, as well as sustainably designed?"

The strength of each of Design for Freedom's three principles underpins the mission and serves as a lodestar; all are inextricably linked and fundamentally support the elimination of forced and child labor from supply chains in the built environment.

Addressing on-site labor is only half of the equation. Forced labor in the building materials supply chain must also be addressed.



Alignment with the United Nation's Global Compact and Alliance 8.7

The Design for Freedom movement has made phenomenal progress in the U.S. since its introduction in 2020. International reach is the next phase for the movement as we increase pace, align with the United Nations Global Compact,[i] and seek to contribute to the Sustainable Development Goals[ii] as we fast approach the 2030 horizon for their delivery. SDGs 8, 9, 11, 12, and 13 is where we believe we can contribute most.

Global Initiative Against Forced Labor

Alliance 8.7[iii] is the global initiative against forced labor, modern slavery, human trafficking, and child labor under Sustainable Development Goal 8.7.

It brings together governments, international and regional organizations, workers' organizations, employers' and business membership organizations, civil society organizations, academic institutions, and other important stakeholders and networks.

Alliance 8.7 provides a platform for partners to share information, promising practices, and lessons learned, as well as collaborate and demonstrate progress.

As a partner, Design for Freedom seeks to harness our resources to best effect in support of government efforts to address forced labor, modern slavery, human trafficking, and child labor in supply chains.

Design for Freedom's International Expansion

Design for Freedom continues to accelerate as a global movement as our international work is well underway, with initial Design for Freedom Accelerators in flight in both India and the UK. Currently, there are 12 Design for Freedom Pilot Projects on three continents.

In India we have appointed a strategic partner, The Centre for Responsible Business (CRB)[iv], based in Delhi. CRB's experience in partnering with various ministries and agencies of the Government of India, academic institutions, civil society organizations, industry associations, and the private sector – along with its expertise in construction supply chains – will be fundamental to our success in this important location.

i UN Global Compact, 2024.
ii "2030 Agenda and the Sustainable Development Goals." United Nations Sustainable Development Group.
iii "Ending Forced Labour, Modern Slavery, Human Trafficking and Child Labour." Alliance 8.7.
iv "India and Sustainability Standards." Centre for Responsible Business.

Ecosystem of the built environment

Means and methods to ethically influence the building materials supply chain

In the UK, our Design for Freedom Accelerator is spearheading a drive with key partners to expand the focus of those in the built environment, already assembled around the issue of forced labor on-site, to include forced labor in the building materials supply chain.

Our strategic partner Rijit Sengupta, CEO, Centre for Responsible Business, Design for Freedom India Accelerator, has noted, "India is well-placed and receptive to advancing Design for Freedom's mission. The nation has seen progress in urban development, digital infrastructure, and transportation, including government initiatives such as development of Smart Cities, to enhance urban living through technology and sustainable practices. In general, a strong impetus is being placed on adopting sustainability measures including environmental impacts, green building standards, afforestation and reforestation, waste management, water conservation, renewable energy integration, and regulatory frameworks. As your strategic partners in India, we are excited to bring our knowledge and expertise to further strengthen the national agenda of building responsible, resilient, and competitive supply chains to elevate the Indian construction sector profile."

"The coming years will require research, innovation, and compliance systems. But, most of all, they will demand a willingness to recognize the presence – and hear the voices – of the people in supply chains rather than simply reaching for their handiwork as unexamined inputs for our projects. While high-profile scandals and advocacy campaigns have drawn attention to slavery and trafficking on projects of international scope, less attention is paid to how those practices are reflected "here at home."

Modern slavery manifests not just as an exploited construction worker on a jobsite, but through the complex and global materials supply chain. Even a firm that is vigilant about health, safety, and workers' rights can be touched by modern slavery, because each brick, each beam, and each pane of glass embodies not only the pride and craftsmanship of its creators but also their experiences of exploitation and abuse."

Lou C. deBaca, Former Ambassador-at-Large to Monitor and Combat Trafficking in Persons in Grace Farms' Design for Freedom report, 2020

Principle 1
Find and Address Embedded Forced Labor

WHY?	To no longer profit from the slavery or exploitation discount.
HOW?	Know your risks back to raw materials, work in collaboration to address forced labor, promote transparency and the decent work agenda.

The Role of Business and Finance in Tackling Forced Labour in the Construction Sector

Dame Sara Thornton, Former UK Independent Anti-Slavery Commissioner
Dr. Martin Buttle, Better Work Lead, CCLA (Churches, Charities, and Local Authorities) Investment Management

Modern Slavery, Forced Labour, and Human Rights

Forced labour is an abhorrent abuse of human rights encompassing several forms of exploitation including taking advantage of the vulnerable, withholding documents, deception, and debt bondage. Its impact is global, and no country is immune.

Regulation outlawing forced labour, human trafficking, and slavery is to be found in international human rights law and in the legislation of many sovereign states. Further, eradicating modern slavery is one of the UN Sustainable Development Goals.

However, slavery and trafficking continue to be all-pervasive with estimates of the number of those affected increasing over recent years[i].

We do not have to accept this situation. Investors, businesses, civil society, and governments are working to tackle this crime.

Design for Freedom is effectively championing a new model for construction and the built environment.

Business and finance's role in tackling the 'slavery discount'

Finding and addressing forced labour is Design for Freedom's first principle, clearly stating that we should no longer be profiting from a 'slavery discount'.

It is clear that a slavery discount is significant. The annual profits generated by forced labour around the world is $236 billion[ii]. This is money taken from the pockets of the most vulnerable and least able to bear the cost.

Businesses which tolerate forced labour and human trafficking have lower labour costs and unfair competitive advantage, allowing them to access capital unfairly. The profits made from slavery and exploitation in our organisations and supply chains are privatised while the costs are socialised.

Responsible business has a huge potential role to drive positive change, both in their own operations and via their international supply chains. Business can set the standards, promote transparency, actively seek out modern slavery, work to fix it, and take action to prevent it.

But business leaders need to set the tone from the top and commit to eradicating all forms of coercive labour practices.

i "Global Estimates of Modern Slavery: Forced Labour and Forced Marriage." International Labour Organization, 2022.
ii "Profits and poverty: The economics of forced labour." International Labour Organization, 2024.

At CCLA Investment Management, we believe the financial sector has a key role to play in setting this leadership agenda. Finance is so intertwined with the rest of the economy; financial sector action can help change the way the whole global economy works. As stewards of business, investors can work with business leaders to ensure that better practices are normalised and incentivised.

That is why we set up "Find it, Fix it, Prevent it" in 2019 as a collaborative investor initiative on modern slavery. Since 2019, the coalition has grown to 65 global investors with $19.6 trillion in Assets Under Management and Advisory[iii]. We work to bring our collective leverage to this challenge engaging businesses, advocating for better policy, and providing thought leadership.

Regulatory expectations

In recent years we are seeing more governments and supranational bodies set new standards for business in tackling forced labour and modern slavery.

The UK, Australia, and Canada have introduced Modern Slavery Acts. In 2024, the European Union introduced the Corporate Sustainability Due Diligence Directive, which requires all companies above a turnover threshold operating or trading in Europe to undertake human rights due diligence and remedy human rights abuses where they find them. The European forced labour ban gives European bodies the power to block the import of products tainted with forced labour. These add to the U.S. Uyghur Forced Labor Prevention Act, which came into force in 2022.

These regulations level the playing field and make the case stronger for businesses to map their supply chains, drive transparency, and address the risks of forced labour in their operations and supply chains.

Construction

The construction sector is a high-risk sector for forced labour. Not only does it rely on a high proportion of relatively low-skilled labour, which in some geographies includes a high proportion of migrants, it also rests on a wide variety of raw and composite materials, ranging from stone, timber, and glass to solar voltaics. It depends on complex supply chains with multiple sub-contractors sourcing from countries with poor human rights records. Procurement is rarely centralised, and it can be difficult to trace where all the materials come from. These inherent risks with gaps in visibility and due diligence processes increase the risk.

As a sector, the construction industry can learn from other sectors that have been working for longer to eradicate forced labour and exploitative labour practices. Sectors as diverse as apparel and footwear, mining and extractives, food retail and production, and banking and finance have all good experiences to share on enhanced human rights due diligence, setting up systems to remedy and prevent modern slavery.

But construction has one advantage over these sectors. Architects and designers have the influence to design in anti-slavery practices, select materials that are lower risk, and prioritize circularity so that supply chains are shortened and brought closer to home. This means some risks can be eliminated before a project begins.

Working together to build a better future

The building blocks are now in place for us to drive a change in practice if we all work together. The Design for Freedom International Guidance & Toolkit is an important resource to support designers, construction firms, and other businesses working in the construction sector to tackle this pervasive crime.

iii "Find it, Fix it, Prevent it Modern slavery report 2024." CCLA. Exchange rate 9.11.24.

"Modern slavery permeates every aspect of our society. It is woven through our clothes, lights up our electronics, and seasons our food. At its core, modern slavery is a manifestation of extreme inequality. It is a mirror held to power, reflecting who in any given society has it and who does not. Nowhere is this paradox more present than in our global economy through transnational supply chains. The growing demand for goods has led to the accumulation of vast wealth, with G20 counties accounting for 85 % of the world's GDP. It has also led to environmental degradation, deep social inequality, and prolific forced labour."

Grace Forrest, Founding Director, Walk Free, in the 2023 "Global Slavery Index"

Principle 2
Pursue Ethical Decarbonization

WHY?	To pursue a just transition which upholds human rights.
HOW?	Analyze decarbonization plans and product development through a human rights lens.

"This is a rare and promising time to initialize 'ethical decarbonization' to assess and lower both embodied carbon and embodied suffering in an opaque weighty marketplace that will have significant humanitarian impact."

Sharon Prince, CEO and Founder, Grace Farms, at the launch of "Building Materials and the Climate: Constructing a New Future," a report developed by UNEP, Yale Center for Ecosystems + Architecture in the framework of the Global Alliance for Buildings and Construction (GlobalABC), September 2023

Ethical Decarbonization: minimizing the risk of embodied suffering in parallel to the movement to minimize embodied carbon, creating a synergy between environmental and social justice goals.

The construction industry, which is one of the largest industrialized sectors at the highest risk of forced and child labor, is positioned to address this convergence of climate change and forced labor together through ethical decarbonization. Only recently has the embedded suffering of forced labor in the building materials supply chain been linked to the climate crisis. As the industry considers reusing building materials, as well as bio-based materials, it can accelerate the elimination of forced labor.

Practices that run counter to the natural environment, prioritize consumption and low-cost production are the same practices that fuel the injustices of forced labor.

Minimizing the risk of embodied suffering can be achieved in parallel to the movement to minimize embodied carbon. Strategies include a shift to regenerative material practices wherever possible by using ethically produced low-carbon earth and bio-based building materials. Even large-scale renewable energy projects that include solar panels will likely have exposure to forced labor in the extracting, processing, refining, and manufacturing of components such as polysilicon, glass, copper, and aluminum.

This grave cost of human exploitation is even more urgent to address in light of the climate crisis, which disproportionately impacts the most vulnerable. Climate change is forcing mass migration as crops, water sources, and farming opportunities continue to diminish. A migrant workforce is one of the top key risk factors for modern slavery.

Ethical Decarbonization

Anna Dyson, Hines Professor of Architecture at the Yale Schools of Architecture and Environment and Founding Director of the Yale Center for Ecosystems in Architecture

The built environment sector is by far the largest emitter of greenhouse gases, responsible for at least 37 % of global emissions. While incremental progress has been made towards reducing the "operational" emissions of buildings, more focus is required to reduce the "embodied" carbon emissions that come from the production and deployment of building materials. The urgent need to decarbonize building materials ethically represents an opportunity for synergy between environmental and social justice goals, since regulation and fair certification are key to both of these aims if the world is to reach its goals for net zero emissions from the built environment sector by the mid-century.

Ethical decarbonization means that in future environmental certification and regulation of sustainable building materials and systems, the impacts on health and wellbeing of humans will be included as an integral part of the health of ecosystems.

The effects of material selection on ecosystems need to be better incorporated into all assessments. Design for Freedom participated in the review process on a Global Report from the UN and Yale CEA - "Building Materials and the Climate: Constructing a New Future," which focuses on three urgent pathways to support stakeholders in order to ethically decarbonize building materials by mid-century:

1. Avoid the extraction and production of raw materials by galvanizing a circular economy, which requires building with less materials through better design, while reusing buildings and recycled materials wherever feasible.
2. Shift to regenerative material practices wherever possible by using ethically produced low carbon earth and bio-based building materials (such as sustainably sourced bricks, timber, bamboo, agricultural and forest detritus) whenever possible.
3. Improve methods to radically decarbonize conventional materials such as concrete, steel and aluminum, and only use these carbon-intensive materials when absolutely necessary.

All three pathways carry both opportunities and increased risks for labor and human rights violations. Reducing the embodied carbon in building materials to net zero may be achievable by 2060, if we promote the development and use of best available technologies combined with a major push to advance the increased use of regenerative, circular biomaterials from forest and agriculture streams by creating stronger links between the development of building products and sustainable forest and agricultural management. This would produce compounding human health and ecosystems benefits by reducing the risk of forest fires, and by parking the carbon within buildings before it decays and emits climate change gases such as methane and CO_2. We would further increase the carbon sequestering performance of regional forests and agricultural land tracks if we select materials that are derived from the culling of forest detritus and agricultural waste streams, as this can lead to rejuvenation and responsible reforestation. However, the agriculture and forestry industries carry increased and different risks for human rights violations, which are disproportionately placed on women and children in many emerging economies. Therefore, there needs to be coordinated certification across the sectors to ensure compliance.

Priorities for Future Development and Advocacy:

1. Make Carbon and Labor Visible: Improve Access to Data
2. Demand Strict but Fair and Transparent Labelling Standards
3. Advocate for Performance-Based Building Codes
4. Encourage Public and Major Private Developers to be Drivers of Change
5. Harness Public Procurement to Support Decarbonization of Materials
6. Tackle Gender Bias in Both Formal and Informal Building Sectors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Yale Center for Ecosystems + Architecture (Yale CEA) created this immersive biomaterials installation, emphasizing the relationship between culture and sustainability, and bringing forth the concept of ethical decarbonization, a new term proposed by Grace Farms CEO and Founder Sharon Prince with Anna Dyson, Founder of Yale CEA.

Dr. James Cockayne, Anti-slavery Commissioner for New South Wales, Australia

Our buildings house us, they provide us places of work, shelter, warmth, and recreation. Buildings meet the needs of humanity. They are artifacts of human cooperation, today drawing on long and complex global supply chains. The way we organise those supply chains tells us much about what we value as a society.

Today, we know that building value chains are responsible for 37% of total carbon emissions.[i] If we are able to decarbonise these supply-chains, we will go a long way to addressing one of the most profound challenges ever to confront humanity – climate change. And we will unlock incredible value: the World Economic Forum estimates as much as $1.8 trillion could be unlocked.[ii]

Yet climate change is not the only unintended cost of how building value chains are organised - how building materials are produced and construction is organised. So, too, in some cases, is forced labour and modern slavery.

What is the true cost of a building?

The true cost of building goes far beyond its financial price tag. Over the past decade, numerous pieces of evidence suggest that construction is one of the high-risk industries for forced labour, deceptive recruiting, debt bondage, human trafficking, and servitude. These human rights abuses can occur on worksites, or in the production and distribution of construction materials.

Despite growing awareness, the complexity of these supply chains, coupled with intricate contractual relationships, make it difficult to identify modern slavery risks. In addition, the sheer number of unique raw and composite materials required for a building makes it nearly impossible to ensure that materials are entirely slavery-free.[iii]

The Design for Freedom International Guidance & Toolkit identifies 12 building materials at high risk of forced labour, such as solar panel, bricks, steel/iron, and stone etc.[iv] Research conducted in 2022 found that PVC used in flooring and pipes installed in homes, schools, and hospitals worldwide is tainted by forced labour in the Uyghur Region of China.[v] Polysilicon, a key material in solar panels, has also been linked to forced labour in China.[vi] Batteries, essential for the renewable energy transition, also come with hefty human costs. Lithium-ion (Li-ion) batteries, which reply on cobalt as a key component, are often produced under conditions involving forced and child labour.[vii]

Despite these human rights issues, building materials, accounting for approximately 45% of a construction project's cost, are rarely inspected or traced for fair labour practices.[viii] The lack of oversight allows exploitation to persist, particularly in the lower tier of the supply chains, where small and micro-contractors operate under intense competition and low profit margins,[ix] creating strong incentives for labour cost reduction through the use of coercion.

Transparency of manufacturing, distribution, and construction processes is essential to addressing these human rights risks. By implementing such measures, we can begin to mitigate the hidden human costs embedded in the buildings that shape the world, paving the way for a more ethical built environment.

i "The building sector is key to the fight against climate change." World Economic Forum, 2024.
ii "Towards Green Building Value Chains: China and Beyond." World Economic Forum, 2024.
iii "Design for Freedom Toolkit." Grace Farms Foundation, 2022.
iv Ibid.
v Murphy, Laura T., et al. "Build on Repression." Sheffield Hallam University, Helena Kennedy Centre, 2022.
vi Cockayne, James, et al. "'The Energy of Freedom'?: Solar energy, modern slavery and the Just Transition." University of Nottingham Rights Lab, 2022; "List of Goods Produced by Child Labor or Forced Labor." Bureau of International Labor Affairs, 2020.
vii "Democratic Republic of Congo: 'This is what we die for': Human rights abuses in the Democratic Republic of the Congo power the global trade in cobalt." Amnesty International, (AFR 62/3183/2016), 2016; "Interconnected Supply Chains: A Comprehensive Look at Due Diligence Challenges and Opportunities Sourcing Cobalt and Copper from the Democratic Republic of Congo." OECD, 2019, Paris; "Making Mining Safe and Fair: Artisanal cobalt extraction in the Democratic Republic of the Congo, White Paper." World Economic Forum, 2020.
viii "Design for Freedom Toolkit." Grace Farms Foundation, 2022.
ix Cockayne, James. "Developing Freedom: The Sustainable Development Case for Ending Modern Slavery, Forced Labour and Human Trafficking." United Nations University, 2021.

Removing coercion, not just carbon, from our supply chains

Our efforts to decarbonize global building supply chains are made more complicated by one thing in particular: the presence of coercion in the supply chains we are seeking to decarbonise, and in some of the key solutions, such as solar panels. To be truly sustainable, however, a transition away from carbon-intensive construction materials and methods must not rely on unlawful coercion. This is not just because relying on slave-made goods is morally repugnant; It also risks making the transition socially unsustainable, and indeed more costly.

On both the revenue and expenses fronts, modern slavery decreases income tax revenue as unpaid wages lead to lower tax collection and reduces consumption tax revenues because those unpaid wages aren't spent. This impact could be substantial: earlier this year, the ILO calculated the profits from forced labour at an estimated $236 billion annually. Slavery also drives up public expenditure on law enforcement, criminal justice, health services and victim support services. UK Home Office researchers estimated direct and victim-related costs of modern slavery in the UK range between GBP 3.3 to 4.3 billion per year.[x]

Both coercion and the warming of the climate are unintended consequences of how we have organised the building and construction ecosystem. But that means they can be addressed – by changing how that system is organised.

This requires collective action. It requires buyers, suppliers, materials producers, developers, investors, insurers, designers, and contractors all to play their part, to take shared responsibility for ensuring the system doesn't rely on coercion at the same time we take action to ensure it doesn't rely on carbon.

Governments have a key role to play here, as market regulators and as catalysts through use of their commercial power.

In the largest economic sub-unit of Australia, New South Wales, the government is taking steps to do just this. Over 400 public sector entities are taking concerted steps to remove products of modern slavery from their more than $30 billion of annual procurement, including all major construction and infrastructure development projects.

We have introduced an anti-slavery clause into our Supplier Code of Conduct. We include language on modern slavery in all our contracts that ensures buyers and suppliers that find modern slavery don't just terminate the contract – shuffling risks to people around the system – but instead work together to remedy harm and remove the reliance on coercion from the suppliers' business practices. State government departments are working together to analyse modern slavery risks in their construction supply chains and to ensure affected workers have effective access to remedy.

The need for collaboration

While NSW Government is the largest single employer in the southern hemisphere, and has considerable local market power, the supply chains that NSW buyers rely on for construction and building materials are, of course, global. It is only through international partnership and collaboration that we will reach the tipping point we need to ensure that our transition is a truly just one, not purchased at the price of slavery.

Design for Freedom is a critical framework for fostering that collaboration. We look forward, in New South Wales, to seeing it grow and flourish – and to bring attention to the social dimension of the transition away from carbon in the global construction sector.

x Ibid.

"The true cost of building goes far beyond its financial price tag. Over the past decade, numerous pieces of evidence suggest that construction is one of the high-risk industries for forced labour, deceptive recruiting, debt bondage, human trafficking, and servitude."

Dr. James Cockayne, Anti-slavery Commissioner for New South Wales, Australia

Principle 3 Prioritize Circularity

WHY?	To truncate supply chains and reduce risk of exploitation.
HOW?	Standardize and document the use of salvaged, upcycled, reclaimed, and innovative products, and challenge existing business models.

The most definitive way to reduce forced labor risks within the construction sector is to prioritize a circular economy. A circular economy could reduce global CO_2 emissions from building materials by 38% in 2050. Within the building materials supply chain, the highest risk is often upstream at the point of raw material extraction, mining, farming, and harvesting. Avoiding procurement of new materials and promoting a closed loop system will help ensure we can meet the demands of an industry poised for significant growth over the next 25 years. Incorporating the use of digital product passports, pre-demolition audits, designing for flexibility and disassembly, and lifecycle assessments are necessary to achieve the goals of a truly circular economy.

"Globally, buildings and construction are responsible for more than 50% of resource extraction, more than 40% of solid waste generation, and nearly 40% of carbon dioxide emissions. We need to change! And the most promising way forward is moving toward a circular economy. This is also a call to action for us as designers and stakeholders in the industry, to go back to the beginning of that loop, go back to the drawing table and design waste out ... But, if you want to start reusing the materials of the existing built environment, we need to know the specifics of that resource. Currently, we have very little knowledge about the materials composition and construction detailing of existing buildings...

Reuse is about respect: Respect for the labor, and the work, and the skills of those that produced these materials in the past. If we claim, 'This material is worthless, this can go to landfill;' we are also disregarding that skill that was put into this material a hundred – or 20 – years ago."

Felix Heisel, Circular Construction Lab, Cornell University at the 2023 Design for Freedom Summit Roundtable, "Material Circularity + Tech Innovation"

Circularity and Regenerative Materials

Lindsay Baker, Chief Executive Officer,
International Living Future Institute

In our collective work to create a more just and healthy world, one of the biggest challenges we face is our ability to envision, with sufficient detail, the better world we are working for. Sometimes we look to parts of the world where we think folks really have it figured out, sometimes we look to science fiction and futurists to show us the inspirational (and cautionary) paths, and sometimes we just try good, old-fashioned brainstorming.

When it comes to envisioning a better supply chain for our global building sector, my favorite method is actually to reflect on the past. A mere 100 years ago, the materials we used to build would have come from a much smaller and more local area. Thus, people who were constructing buildings had shorter supply chains, more familiarity with the people they were buying materials from, and more of a visceral and visible sense of the impacts those materials had. In the past 40 years, globalization has fundamentally transformed and disrupted those old business models. Today we live in an economy within which it is deeply challenging to know the provenance of our building materials. While this economy has expanded our materials palettes and made possible a spectacular array of design opportunities, it has also made it deeply challenging to build in a way that has a positive impact on the world. But I find it inspiring to start by remembering that it wasn't always challenging to have a positive impact through the act of building.

Today, through our work at Living Future and our community of collaborators including Design for Freedom, we are working to make it easy to build with positive impact – we call this regenerative building. When we say that a building or a design is regenerative, we mean that it has a positive impact on the environment, on our health, and on the health of our communities. Through the Living Building Challenge and other programs at Living Future, we provide practical tools for architects and engineers to pursue specific and achievable regenerative goals, and then we celebrate and share these examples of regenerative buildings to the larger community in the hopes that it inspires and creates a new normal for "what good looks like." Each building is much more than one building: each project contains thousands of decisions, products, learning points, relationships...and every one of those has its own ripple effect.

When we learned about Design for Freedom at Grace Farms, we were thrilled to find kindred spirits dedicated to a critical piece of the impact that a building has on the world, and it is a piece that has not received the attention it deserves. The Design for Freedom tactics and community are a key complement to the movement for regenerative buildings as we seek better ways to ensure that buildings are not only environmentally beneficial, but also beneficial for human health and social justice around the world. We know that the modern environmental movement has not focused enough on the human impacts – what Sharon Prince has eloquently described as the "embodied suffering" – of the materials we use every day. We know that justice is fundamental to our work. What is promising now is the growth of awareness and the readiness to address these issues. And that's where this Guidance & Toolkit comes in.

Building with the goal of regeneration reduces the risk of forced labor in a number of ways. First, the movement toward regenerative buildings and regenerative materials is one that deeply values and relies on transparency and accountability in our supply chains, and this is a key foundation for eliminating forced labor in the building materials and construction industries. This is a formidable project that is full of complex regulations, a wide variety of stakeholders, data and technology questions, and many other devilish details. But we are building a strong movement to coordinate the push for supply chain transparency, and we are gaining speed and scale from having more voices at this table.

Second, generally speaking, we place high value on shorter supply chains and circularity practices. Simply put, we find it easiest to build with positive impact when we develop supply chains like local reuse centers, materials take-back programs, and other materials innovations that allow us to reuse materials within our communities and/or within our specific materials ecosystems. These practices not only preserve the value of our materials, thus decreasing our need for virgin materials, but they also reconnect people and systems in the building industry in meaningful new relationships.

And lastly, regenerative building, as a practice, is a systems operation. As we show how attending to social, environmental, economic, and cultural considerations can yield better results, our movement will gain traction. The alignment and collaboration that is happening now is already yielding acceleration that only a few years ago seemed unimaginable. But in this movement the unimaginable is possible...and on its way.

Still, it is important to note, as the Design for Freedom work has highlighted, that not all materials that have environmentally beneficial attributes are also currently the best materials to use from the perspective of forced labor risk. We wish it were that easy, but indeed, some of the materials that Design for Freedom notes have the highest risk of embedded slavery are classic favorites of the green building community for their bio-based nature, such as timber. This is why a coordinated movement that insists on multi-attribute assessment and the foundation of traceability and transparency are key to our success. Uni-dimensional decisions that only optimize for carbon impact or chemical hazard run a significant risk of overlooking the real and significant negative impacts on people and communities around the world.

So in this spirit of collective impact, I encourage you to take a moment to envision how you wish to play a part in the future economy that we create. Perhaps it is just one particular product category supply chain that you want to focus on specifying differently, perhaps it is an intervention you want to make in your own local building materials industry, or perhaps something more global and far-reaching.

Whatever your role, please know that you are a part of something bigger, and that the goals of the regenerative buildings movement and community are coordinated with the work to eliminate forced labor in our building materials supply chains. We are here to create the future of our building materials economies together, and to ensure that this shift serves all people, all communities, around our complex and delicate world.

"The Design for Freedom tactics and community are a key complement to the movement for regenerative buildings as we seek better ways to ensure that buildings are not only environmentally beneficial, but also beneficial for human health and social justice around the world."

Lindsay Baker, Chief Executive Officer, International Living Future Institute

Critical Issues

Legal
A Legal Overview of Slavery in the Construction Sector, David Alfrey

Insurers
Leveraging Insurance to Drive Ethical Supply Chains, Abi Potter Clough

Investors
Investors and the Elimination of Child Labor, Benafsha Delgado

Prison Labor
The Use of Prison Labor in the United States

A Legal Overview of Forced Labour in the Construction Sector | UK Perspectives

David Alfrey, Co-Lead of ESG | Addleshaw Goddard

Forced labour broadly encompasses any form of involuntary labour practices. Businesses are increasingly required to conduct due diligence and confirm that their supply and value chains are free from involuntary labour practices.

Environment, Social and Governance (ESG)-related laws from the EU and the UK carry extra-territorial reach to ensure that harms to people are due diligenced and disclosed by the private sector, regardless of their operational location. These carry sanctions that range from specific performance and civil fines, through to personal criminal liability for the fiduciaries and key decision-makers in the business. Whilst the regulation creates the obligation and levels the playing field, through integration of technology and collaborative practices across the supply chain, there is an opportunity to create fairer working conditions globally whilst also improving one's ESG credentials.

Contracting and Enforcement in the Construction Sector

Of the 50 million people worldwide in modern slavery, the construction and development sector accounts for more than 20% (over 10 million people). The construction sector remains vulnerable on key contractual considerations concerning ESG-related matters, including for forced labour.

Legal contracts offer an opportunity to proactively address this within the developing regulatory landscape:

Evidence of Due Diligence. Firstly, where clauses, such as warranties and indemnities, are included in contracts, these are frequently treated as "self-confirmatory" without effective due diligence by the counterparty. It is important for legal due diligence to require and assess evidence of any confirmations being made, especially as sanctions move toward criminality. Dependence on a warranty is not a defence for the company receiving the warranty as to why fuller due diligence was not completed.

Enforcement of Adjustments when Violations are Found. Secondly, where evidence has materialised around failures, there is a reluctance to enforce contractual clauses. This is driven by a combination of factors, including the overall delivery timescales and economic considerations to the projects. One solution may be specific performance requirements, including mandating hiring of another firm at the cost of the breaching party to fulfil the contract, or to make back-dated and restorative payments in order to be paid for its services in the supply chain.

Transparent Reporting Mechanisms in Supply Chain. Finally, the combination of worker-vulnerability, and complexity of the supply chains in construction (e.g. sub-contractors), there is a lack of resource and capacity to understand vulnerabilities and provide effective grievance mechanisms and associated remedy. Governance standards across the supply chain should be assessed to ensure that the most vulnerable parts of the supply chain have policies, processes and systems in place to provide prompt remedy where harms have occurred with transparent reporting across the supply chain and accountable persons identified.

Key Regulation

1. Corporate Sustainability Due Diligence Directive (EU) and German Supply Chain Act (Germany): Creates obligation for supply and value chains for relevant entities participating in the EU markets (even if domiciled outside the EU) to ensure accountable due diligence that identifies, prevents, mitigates and remediates actual and potential impacts on people.
2. Modern Slavery Act (UK): Creates obligation to set out the steps they have taken to verify that their businesses and supply chains are free of any forced labour. Proposals for criminal liability for false statements are being considered.

Date Enacted	Law Name	Territory
2024	Corporate Sustainability Due Diligence Directive	European Union
2023	Fighting Against Forced Labor & Child Labor in Supply Chains Act	Canada
2022	Corporate Sustainability Reporting Directive	European Union
2022	Ordinance on Due Diligence and Transparency	Switzerland
2021	Supply Chain Due Diligence Act	Germany
2021	Uyghur Forced Labor Prevention Act	United States
2021	Transparency Act	Norway
2019	Child Labor Due Diligence Act	The Netherlands
2018	Modern Slavery Act	Australia
2017	Duty of Vigilance Law	France
2016	Trade Facilitation and Trade Enforcement Act of 2015	United States
2015	Modern Slavery Act	United Kingdom
2010	California Transparency in Supply Chains Act	United States
2000	Trafficking Victims Protection Act	United States

William N Shepherd & Jeff Shacknow, Litigation, White Collar Defense, Investigations & Anti-Human Trafficking Practices | Holland & Knight

The Unique Role of the Insurance Sector

In today's interconnected world, where globalization has woven economies and societies together, human trafficking often hides within the shadows of global commerce, generating illicit profits through forced labor. Criminal enterprises, including those involving forced labor, continuously adapt to shifting circumstances, pulling unsuspecting sectors into their activities. One such unlikely player is the insurance industry.

The relationship between forced labor and the insurance industry is both complex and concerning. Criminals often devise sophisticated schemes to exploit insurance companies – unwittingly allowing these firms to finance trafficking operations. This exploitation not only puts the integrity of the insurance industry at risk, but also allows human trafficking networks to thrive in an underregulated environment.

However, the insurance industry holds a critical role in combating forced labor. By evolving its practices and strengthening its involvement in prevention, protection, and prosecution, the industry can significantly contribute to tracking and halting the flow of money that finances traffickers.

Key intersections arise for insurers in many areas, including but not limited to building projects, goods in transit, and institutional investments.

For insurers of building projects, forced labor within the construction supply chain presents significant risks. It is critical for appropriate systems and processes to guard against forced labor not only for the protection of victims but as a mitigating structure to prevent insurers from facing legal liabilities. Additionally, an association with weak preventative measures can severely damage an insurer's reputation, leading to lost business. Stricter due diligence is necessary to ensure that projects they underwrite are free from forced labor, which could increase operational costs and compliance burdens.

For insurers of goods in transit, forced labor poses significant challenges. The threat of the use of forced labor in relation to high-risk goods can disrupt supply chains, leading to delays or seizures of goods which insurers may have to cover. If forced labor is discovered, insurers may need to cancel or deny coverage, potentially leading to legal disputes and financial losses. This sector also faces scrutiny from regulators, particularly in industries like building materials where forced labor is more common.

For insurers acting as institutional investors, forced labor introduces considerable portfolio risks. Unknowingly investing in companies involved with forced labor can expose insurers to financial risks if these companies face boycotts, sanctions, or a decline in stock value. Adhering to Environmental, Social, and Governance (ESG) criteria adds another layer of complexity, as forced labor violations can disqualify certain investments. Moreover, stakeholder pressure to divest from companies involved in forced labor can impact investment strategies and reduce portfolio diversity.

Across these categories, forced labor poses substantial risks – not only in terms of direct financial losses but also through legal, reputational, and compliance risks. To address these challenges, insurers must enhance their due diligence, risk assessment, and ethical compliance practices. Insurers must also be aware of the potential damage to their reputation. While the industry typically focuses on visible risks like wildfires and floods, human trafficking presents a "quiet risk" that is equally dangerous and demands attention.

As global efforts to combat force labor intensify, the insurance industry must recognize its pivotal role in this battle and step up to meet the challenge head-on.

Leveraging Insurance to Drive Ethical Supply Chains

Abi Potter Clough, CEO, AbiLeads LLC

The risk and insurance industry has often been the catalyst for positive societal change, influencing the social and economic landscape for the betterment of humanity. From incentivizing safer driving habits through premium discounts to changing building safety standards and fire codes, insurers leverage their influence and expertise to reduce risk and reshape the world into a better and safer place for future generations. Through underwriting policies, insurers influence behaviors and impact industries to promote public welfare.

A persistent challenge requiring the influence of the insurance industry is forced labor in global supply chains. This issue poses significant human rights concerns – and is one where the risk and insurance industry can play an important role. The risk is particularly prevalent in sectors linked to the built environment, like construction, where supply chains are complex, often opaque, and extend across multiple countries and industries. Construction materials are sourced from various parts of the world, sometimes from regions where labor protections are weak and exploitation common. Because of the global nature of the construction industry, forced labor within supply chains touches materials used in projects all over the world, in the largest metropolitan areas and smallest rural towns.

The insurance sector is uniquely positioned to leverage its reach across industries, holding the construction industry and others accountable for improving ethical sourcing practices and driving meaningful change. Insurers provide coverage not only for physical risks, like damage to a factory from a tropical storm, but also coverage for exposures like business interruption, reputational risk, and liability – and it is within these coverages that insurers can best influence the behavior of policyholders by encouraging and incentivizing ethical practices.

Companies within the built environment that prioritize transparent, humane, and ethical supply chain practices could benefit from lower premiums and access to specialized coverage. Conversely, businesses that profit from opaque or ambiguous supply chains may be required to submit more documentation to secure coverage or may pay higher premiums, if they can find coverage in the standard market at all. By writing policies to reward ethical practices within supply chains and enforcing stricter reporting requirements to prove transparency, insurers can influence businesses toward greater responsibility and accountability for the materials and labor they source.

The insurance and construction industries share a moral imperative to leverage their impact by eliminating forced labor within the supply chain and improving conditions for people around the world. Insurers can proactively design policies to incentivize ethical practices and require rigorous risk assessments, partnering with the construction industry to drive change and social progress.

We are facing a pivotal moment in history where together we can influence the future of the construction industry, ensuring that future builds stand as monuments to human dignity, equity, and compassion.

"The insurance sector is uniquely positioned to leverage its reach across industries, holding the construction industry and others accountable for improving ethical sourcing practices and driving meaningful change."

Investors' Impact on Ending Forced Labor Practices

Now more than ever, investors are taking risk into account when making investment decisions – financial risk and reputational risk. Investors are asking portfolio managers about a firm's commitments to environmental, social, and governance (ESG) principles and if they have a history of compliance with laws regulating sustainable and ethical practices.[i]

As we seek to create system transformation and propel the Design for Freedom movement, it will require the full participation of all sectors – including finance.

Grace Farms Foundation has long recognized the impact the financial industry can have on eliminating modern slavery. Grace Farms held a United Nations University convening for the finance sector and modern slavery from which UN University's Finance Against Slavery and Trafficking (FAST) emerged as well as an impactful report "25 Keys to Unlock the Financial Chains of Human Trafficking and Modern Slavery" in July 2017.

Despite universal prohibitions, modern slavery continues to thrive, generating more than $230 billion in illicit profits annually.[ii] Financial institutions can be linked to modern slavery and human trafficking either directly through their own operations or indirectly through their business relationships. Given the financial sector's deep integration with the global economy, its actions can significantly influence systemic change. At this critical moment, the financial sector has a unique opportunity to spearhead the transformation of our global economy to combat modern slavery and human trafficking.

Changes to the global regulatory framework will demand increased accountability from investors and the financial sector. The Finance Against Slavery and Trafficking (FAST) report, A Blueprint for Mobilizing Finance against Slavery and Trafficking, argues that the world's bankers, investors, insurers, and financial partners "have unparalleled influence over global business... and that finance is a lever by which the entire global economy can be moved."[iii]

There is currently no agreement of decision-critical human rights metrics for the investment sector. It is therefore often difficult for investors to introduce and monitor human rights measures and impact. A recent report for the Human Rights Council on the issue of human rights and transnational corporations and other business enterprises clarifies the responsibilities of investors with regard to respecting human rights under the Guiding Principles on Business and Human Rights. It also outlines how investors can align the environmental, social and governance, and sustainability, approaches they take with their responsibilities under the Guiding Principles.[iv] Indeed, one of its key recommendations is for states to develop and support the implementation of ESG and sustainability investment approaches which account for human rights.

"There is currently no agreement of decision-critical human rights metrics for the investment sector. It is therefore often difficult for investors to introduce and monitor human rights measures and impact."

Grace Farms Foundation

i "Uyghur Forced Labor Prevention Act Statistics." U.S. Customs and Border Protection, 2023.
ii "Profits and poverty: The economics of forced labour." International Labour Organization, 2024.
iii "A Blueprint for Mobilizing Finance Against Slavery and Trafficking." Finance Against Slavery and Trafficking (FAST), 2019.
iv "A/HRC/56/55: Investors, environmental, social and governance approaches and human rights." United Nations Human Rights, Office of the High Commissioner, 2024.

Investors and the Elimination of Child Labour

Benafsha (Bee) Delgado, Head of Social Sustainability,
UN Global Compact Network UK

Infrastructure development is becoming a priority across the world. Driven by government mandates such as the UK Labour Governments 'Planning and Infrastructure Bill',[i] the industry is projected to exhibit a compound annual growth rate of 5% over the next 10 years.[ii]

This directive underscores the urgent need to modernise the built environment to support economic growth and tackle various pressing challenges of the 21st century. In the UK, the government's focus on infrastructure is expected to channel billions of pounds into projects that enhance connectivity, sustainability, and resilience. Globally, spend on infrastructure continues to grow but so do challenges to ensure this growth is sustainable, equitable, and responsible. Data shows that requirement for investment is in the trillions, with most needs coming from emerging markets and lower-income countries.

As global infrastructure projects expand, for investors, this shift is more than a financial opportunity – it's a chance to contribute to a legacy of sustainable and inclusive development. Frameworks like RAPID can ensure that investments align with both financial goals and broader societal needs. The UN Global Compact Network UK's[iii] RAPID Framework[iv] is an essential tool in this domain, specifically designed to help investors identify, address, and ultimately eliminate the risk of child labour within their supply chains.

The built environment is a sector where large-scale projects often involve complex, multi-tiered supply chains. These can span numerous countries and industries, making it challenging to ensure ethical practices at every level. By adopting RAPID, investors in infrastructure can systematically assess their portfolio's supply chains to uncover potential risks of child labour and take proactive measures to mitigate these risks. In this way, they can future-proof their investments against risks from reputational damage and legislative changes.

The framework outlines five key stages of involvement for investors: Reframe, Agree, Provide, Insist, and Develop. Investors should 'Reframe' human rights as a cross-cutting issue, 'Agree' on relevant metrics, 'Provide' clarity by asking pressing questions, 'Insist' on substantial evidence, and 'Develop' capacity and capabilities.

The RAPID Framework offers a practical pathway for investors to manage their supply chains effectively and responsibly. As infrastructure spending continues to grow globally, particularly under policies that drive large-scale developments, the need for ethical oversight has never been greater. Investors who adopt the RAPID Framework will not only safeguard their portfolios but will also contribute to the broader goal of eradicating child labour from global supply chains.

i "The King's Speech 2024 - New Planning Reform Bill to Boost UK's Housing and Infrastructure." IBB Law, 2024.
ii "Global Infrastructure Construction Market Overview." Market Research Future.
iii UN Global Compact Network UK.
iv "Rapid Institutional Investor Guidance Framework for the Elimination of Child Labour in Supply Chains." UN Global Compact Network UK, Rapid-Framework.

The Use of Prison Labor in the United States

Grace Farms is initializing an understanding of how prison labor makes its way into our interior furnishings and other products within the supply chain. We are partnering with advocacy groups, industry professionals, and universities to gain insight into the use of prison labor specific to manufacturing and material procurement, as well as prison design and construction.

A History of Exploitation

Prison labor in the United States is a government supervised program protected by the Thirteenth Amendment to the United States Constitution. Ratified in 1865, it made slavery and involuntary servitude unconstitutional in the United States except as punishment for crime whereof the party shall have been duly convicted.

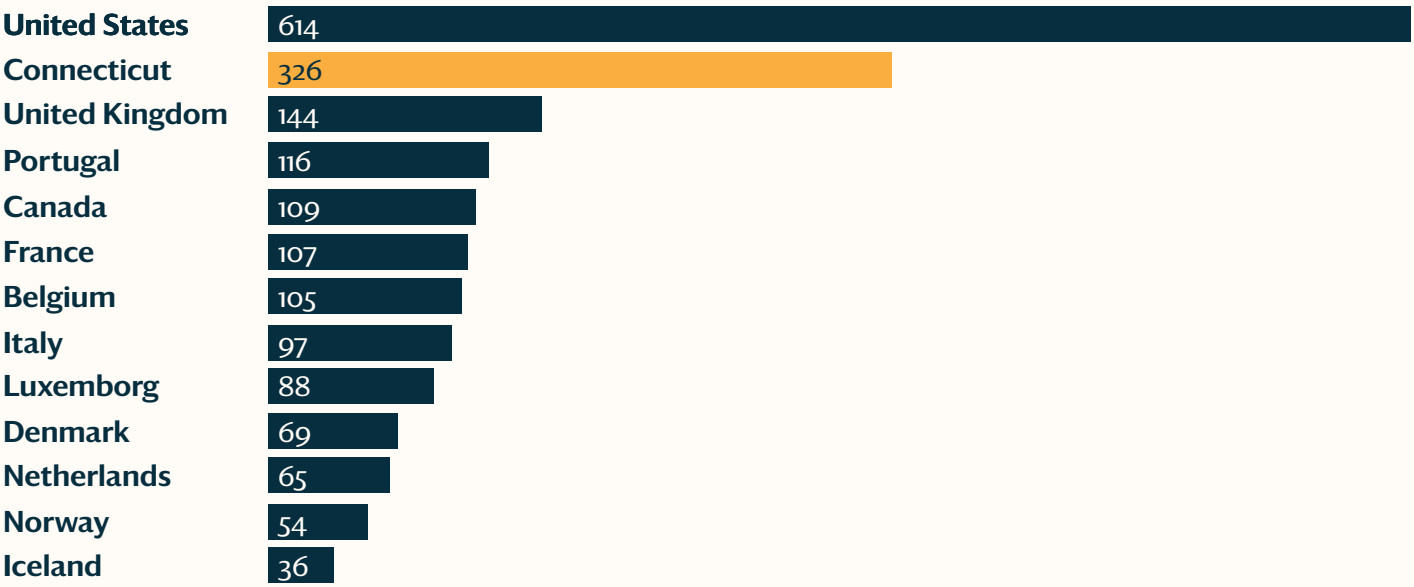
"A sentence of imprisonment constitutes only a deprivation of the basic right to liberty. It does not entail the restriction of other human rights, with the exception of those which are naturally restricted by the very fact of being in prison. Prison reform is necessary to ensure that this principle is respected, the human rights of prisoners protected and their prospects for social reintegration increased, in compliance with relevant international standards and norms."[i]
United Nations Office on Drugs and Crime

A Uniquely American Problem

With the highest incarceration rate of any democracy on the planet, the U.S. holds 1.2 million people in prison, more than 20% of the world's incarcerated population.[ii] All 50 states individually incarcerate more people per capita than most countries.

Incarceration Rates Comparing Connecticut and founding NATO countries

incarceration rates per 100,000 population



Source Prison Policy Initiative

i "Decade of Action." United Nations Office of Drugs and Crime.
ii Ross, Andrew, et al. "Abolition Labor The Fight to End Prison Slavery." OR Books, 2024.

Forced Labor

More than 70% of people in state prisons are required to work their jobs or else face punishments, including but not limited to, the threat of solitary confinement, denied family contact, and even parole. Only 29% voluntarily chose to work while imprisoned.[iii] Forced labor also limits people from participating in educational and rehabilitative programs. Nationally, workers earn little to no pay and on average make between $.13 and $.52 per hour. On top of these incredibly low wages, up to 80% is taken by the government in fees.[iv]

Privatization

The U.S. was the first country in the world to privatize prisons. Today 8% of confined people are held in private prisons. Additionally, more than 90% of the 30,000[v] daily immigrant detainees are held in private prisons. In total, private companies make $5.8 billion annually locking people up. Immigrant detention is driven by more bodies, longer stays, and low cost.[vi] Thousands of immigrants have been subjected to forced labor while in detention, working for $1 per day and violating the Trafficking Victims Protection Act (TVPA),[vii] as the majority have not been convicted of a crime.

Prison Design & Construction

There are over 7,000 correctional facilities across the U.S. with annual spending totaling $4.6 billion on prison construction.[viii] The American Institute of Architects (AIA) addresses prison design in its Code of Ethics and Professional Conduct:

- Rule 1.403 - Members shall not knowingly design spaces intended for execution. Designing spaces intended to end human life is inconsistent with the ideal of upholding human rights.

- Rule 1.404 - Members shall not knowingly design spaces intended for torture, including indefinite or prolonged solitary confinement. Members should employ their professional knowledge and skill to design buildings and spaces that will enhance and facilitate human dignity and the health, safety, and welfare of the individual and the public.

Industry Accountability

"So much of what we know as architects is called into question when faced with having to specify or utilize goods that are the product of the prison industrial complex. Shedding light on this issue will hopefully lead to reforms, state-by-state, so that we can align with the regulations imposed on imported goods to ensure they are not produced by forced labor practices and conditions. WXY is grateful to be involved in the Design for Freedom International Guidance & Toolkit."
Claire Weisz, FAIA, Founding Principal at WXY architecture + urban design

"Recently, we declined a request from a large design firm for our furniture to be included in their specification for a new prison project. We will likely continue to decline to quote Hightower products specified for use within jails, prisons, or any detention/correctional facilities. If we do accept business at these types of institutions, we will donate any profits from the project to organizations supporting and uplifting justice-impacted individuals within the state of the specified project."
Natalie Hartkopf, Co-owner & CEO of Hightower

Goods Made with Prison Labor

Every state, except Alaska, requires prisoners to produce goods. Several states have requirements that publicly funded projects, including state universities, purchase products made with prison labor. Goods produced with prison labor include furniture, equipment, electronics, signage, concrete products, and wood doors.[ix]

iii Wang, Leah. "The state prison experience: Too much drudgery, not enough opportunity." Prison Policy Initiative, 2022.
iv "Captive Labor: Exploitation of Incarcerated Workers." ACLU, 2022.
v Hyunhye Eunice. "Unchecked Growth: Private Prison Corporations and Immigration Detention, Three Years Into the Biden Administration." ACLU, 2023.
vi "The Prison Industry, Mapping Private Sector Players." Worth Rises, 2020.
vii Sherman, Samantha. "Defining Forced Labor: The Legal Battle to Protect Detained Immigrants from Private." The University of Chicago Law Review, 2021.
viii "The Prison Industry, Mapping Private Sector Players." Worth Rises, 2020.
ix "Private Companies Producing with US Prison Labor in 2020: Prison Labor in the US, Part II." Corporate Accountability Lab, 2020.

"And though members of Congress denounce imported goods made with prison labor in places like China's Xinjiang province, the offices of many government agencies in Washington and elsewhere are stocked with furniture and supplies made by prisoners in this country. In fact, federal agencies are mandated to purchase goods from federal prisons, just as state or municipal agencies, including public schools and universities, often must consider sourcing from state penitentiaries. In many states, prison-made goods are freely available on the open market and shipped overseas."

Andrew Ross, Tommaso Bardelli and Aiyuba Thomas -
Members of the New York University Prison Education
Program Research Lab and authors of "Abolition Labor: The Fight to End Prison Slavery."

Is your building ethically sourced, forced-labor free, as well as sustainably designed?

Raw and Composite Materials at High-Risk of Forced and Child Labor

Without undertaking appropriate human rights due diligence in our global supply chains, there will continue to be a lack of knowledge, human rights abuses, lack of accountability and no reduction in the number of people in situations of forced labor. Much of the construction industry already assesses products for environmental and carbon impacts, and for performance and health, but assessing supply chains for salient human rights abuses remains low on the agenda and is often bypassed because it is deemed too complicated, not 'my' problem, or believed not to present a problem at all. Some undertake a tick box approach to compliance which often bears little relation to gaining a fuller understanding the extent of the situation and the risks which exist for the individuals working in supply chains, or for the businesses they supply.

The number of products and materials used in the built environment is staggering. It is sobering to learn that in 2020, the mass of human-made objects, or anthropogenic mass, exceeded the dry weight of all life on Earth for the first time.[i] It is also worth noting that concrete contributes to over 33% of anthropogenic mass.[ii]

This knowledge underscores the importance and urgency of Design for Freedom's mission. In seeking to eradicate forced and child labor, we have the opportunity to clearly connect the inextricably linked agendas of sustainability, circular economy, and decarbonization.

The materials listed here are ubiquitous in the built environment. They are also at high-risk of forced and child labor and are often extracted and produced in dangerous conditions.

Together, G20 countries account for 85% of the world's GDP. China and the U.S. are the world's largest exporting and importing economies.[iii] The import/export data on the following pages demonstrate the tremendous capacity these countries have to move the market as it relates to materials made with forced labor.

What better place to begin than further developing our own knowledge and understanding of the inherent risks that lie within the global supply of the raw and composite materials upon which we all rely.

i Elhacham, Emily, et al. "Global human-made mass exceeds all living biomass." Nature, 2020.
ii "This is the total weight of everything humans have created since 1990." World Economic Forum, 2021.
iii "Global Estimates of Modern Slavery: Forced Labour and Forced Marriage." International Labour Organization (ILO), 2022, Geneva.

"We don't want to continue to have to tell our stories to wake people up. We don't want repression, we don't want damages. We want it to lead with us in changing this world by building industries, finance, goods, services, and labor that is a hundred percent transparent."

Nasreen Sheikh, Modern Slavery Survivor, Visionary Leader, Author, and Founder, Empowerment Collective Foundation

Raw and composite materials at high risk of embedded forced and child labor

Material Overview: Bricks

More than 20 countries use forced and/or child labor to produce bricks domestically.

The brick industry is particularly vulnerable to issues of forced and child labor, with significant concerns at kiln sites in countries like Afghanistan, India, and Nepal. Many workers, including children born into debt-bonded families, face harsh conditions.

Although many countries have legislated to prevent forced and bonded labor practices, such efforts are often undermined by corruption and weak enforcement. Officials routinely overlook forced and child labor at brick kilns as such practices often have their roots in illicit business relationships and facilitation payments (Verisk Maplecroft).

High levels of poverty are a key driving factor underpinning the forced labor systems prevalent in the brick industry, forcing entire families to work to pay back loans taken out to pay recruitment fees or assumed generational debt. Combined with exploitative practices such as withholding wages, the brick industry in some countries can depend on keeping workers in a state of poverty to fuel its labor pool.

Nepal, for example, has made strides in addressing traditional forced labor practices and is actively working towards eradicating forced and child labor through initiatives like the Alliance 8.7, a global collaboration working to eradicate forced labor, modern slavery, human trafficking, and child labor, in accordance with the United Nation's Sustainable Development Goal (SDG) Target 8.7. Recent research indicates that forced and child labor continue to persist in the country's brick industry.

Between 30,000 and 60,000 children work in Nepalese brick kilns, with over one-third working as forced laborers.[i] A 2021 Unicef survey[ii] revealed that out of 176,373 manual laborers in brick kilns, 6,229 (3.5%) are in forced labor and approximately 34,593 children are living in brick kilns. Children represent about 10% of the workforce and 96% of these working children were identified as engaging in child labor in Nepal.

The combined brick and glass industries are responsible for 3% of global energy-related carbon emissions.[iii] Globally, coal is the primary fuel source used in brick kilns. In Cambodia, where over 9% of brick workers are children, pre-consumer waste from high-profile global apparel brands also fuels the kilns.[iv] This poses a greater risk in already dangerous working conditions. The fast fashion textile waste often contains toxic chemicals including ammonia, chlorine bleach, PVC, formaldehyde, and heavy metals[v] causing additional negative health impacts.

Workers may be forced to work under the threat of violence, while also being exposed to hazardous conditions, including extreme heat, dust inhalation, and physical exhaustion. Female workers reportedly face sexual harassment and violence (Verisk Maplecroft).

In countries vulnerable to climate change, changing weather patterns and extreme weather events, especially heavy rainfall, can disrupt work at kilns, indebting workers further while they are unable to produce bricks. Deteriorating agricultural yields, in part caused by climate change, are also pushing farmers out of agricultural work and into brick kiln labor (Verisk Maplecroft).

i "Report on Employment Relationships in the Brick Industry in Nepal." UNICEF, 2021.
ii Ibid.
iii "Building Materials and Climate: Constructing a New Future." United Nations Environment Programme, 2023.
iv "2024 List of Goods Produced by Child Labor or Forced Labor." United States Department of Labor, 2024.
v Brickell, Katherine, et al. "Blood Bricks: Untold Stories of Modern Slavery and Climate Change from Cambodia." Royal Holloway, University of London, 2018.

Components of Brick[vi]

Silica (SiO_2) 55% | Alumina (Al_2O_3) 30% | Iron oxide (Fe_2O_3) 8%
Magnesia (MgO) 5% | Lime (CaO) 1% | Organic matter 1%

Applications and End Products:

- Construction (Walls, Facades, Foundations)
- Paving
- Landscaping

Relevant Certifications

1. Better Brick Nepal by GoodWeave

Top Brick Producing Countries[vii]

1. China 1 trillion or 77.3% of the global market
2. India 200 billion or 15.5% of the global market
3. Pakistan 45 billion or 3.5% of the global market
   Total world production: 1.5 trillion bricks per year (average)

Building Brick Exports by Country (Value in U.S. dollars)[viii]

1. Belgium $238 million - 1.1 billion bricks
2. Germany $118 million - 171 million bricks
3. Netherlands $74 million - 201 million bricks

Building Brick Imports by Country (Value in U.S. dollars)[ix]

1. United Kingdom $199 billion - 465 million bricks
2. Germany $74 million - 142 million bricks
3. United States $59 million - 271 million bricks

vi "Composition of Bricks - Function of Ingredients." Civil Engineering.
vii "Mitigating Black Carbon And Other Pollutants From Brick Production." Climate & Clean Air Coalition, 2015.
viii "Building bricks exports by country in 2021." (HS: 690410). World Integrated Trade Solution, World Bank, 2021.
ix "Building bricks imports by country in 2021." (HS: 690490) World Integrated Trade Solution, World Bank, 2021.

Material Expert Analysis

Dr. Doreen S. Boyd, Professor, School of Geography, University of Nottingham

The global brick industry was valued at $230 billion in 2020 and projected to grow from that year at a compound annual growth rate of 8% to 2026. The world over sees countries involved in brick production, driven by economic development. Currently, China accounts for over half of global brick production. This is for both domestic use and export, top of all countries in a rank of export value. India, South Africa, and Saudi Arabia in particular have economic growth pathways reliant on brick production, with India's brick industry expecting to see a growth of 8-10% annually, with an export value rank of third globally.

Current discourse around the brick industry has referred to the kilns that produce the bricks, particularly burnt clay ones, as objects of UN Sustainable Development Goals intersectionality - SDG 8 (decent work) and those relating to urbanisation (SDG 11, 12), environmental degradation and pollution (SDG 3, 14, 15), and climate change (SDG 13). The material risks to the SDGs posed by brick kilns are of concern to the country of brick production. Global system processes (i.e., dispersion of emissions of greenhouse gases from kiln stacks firing bricks by means of coal) means that risks to SDGs posed by brick production is of concern to all countries.
Although great strides have been made to reduce the environmental impacts of brick production – more developed countries have upgraded their brick production industries by adopting cleaner technologies – it is the case that many South Asian countries are still using traditional and outdated technologies of brick production.

This traditional approach to brick production in many countries relies on a manual production system meaning working conditions are harsh and precarious. Lack of alternative work and endemic poverty means workers may accept offers of work with poor living and working conditions, and no written contracts. It is also a sector that is mainly unregulated. These are conditions where debt bondage may prevail and has been documented to occur in these brick kilns. This particular SDG risk (no. 8 - decent work) is also concerning for those countries beyond those of brick production, due to the often complex supply chains associated with exported bricks. Given that clay burnt bricks have many virtues as a construction material and will continue to be exported while the global economy continues to grow, prompting more construction, there is a clear and pressing need for initiatives such as the Design for Freedom movement, where key stakeholders that are involved in using key building material are brought together in order to realise and address the sustainability of brick-making and to build a more equitable future for those involved in producing bricks.

> "Given that clay burnt bricks have many virtues as a construction material and will continue to be exported while the global economy continues to grow prompting more construction, there is a clear and pressing need for initiatives such as the Design for Freedom movement ..."
>
> Dr. Doreen S. Boyd

Material Overview: Concrete

Half of all buildings on Earth are made from concrete.

Concrete is by far the most widely used construction material in the world. More than 70% of the world's population lives in a building containing concrete.[i] There are 80 metric tons of concrete per person alive today.[ii] China poured more concrete between 2018 and 2020 than the United States has since it has existed.[iii]

Concrete is made up of several materials including cement, sand, gravel, and crushed stone. These materials often come from countries where material extraction may not be regulated, and worker safety and fair labor laws are not enforced or do not exist. Concrete produces 8% of the world's carbon dioxide emissions, making it the largest contributor to embodied carbon in the built environment. It is also at high risk of forced labor that occurs during the quarrying of limestone and gravel, and the mining of mica and soda ash.

- The illegal trade of sand, which is a key component of concrete, is valued at the third-highest illegal trade globally, with revenues ranging from approximately $200 billion to $349 billion U.S.[iv]
- The concrete industry produces 4 billion tons of carbon dioxide each year.[v]
- Concrete produces as much carbon dioxide emissions as all the cars in the world combined.[vi]

i "Six Interesting Facts About Concrete." Cement Concretes & Aggregates Australia, 2023.
ii Conway, Ed. "Material World: The Six Raw Materials That Shape Modern Civilization." Penguin Random House, 2023.
iii Ibid.
iv Ramodon, Luis Fernando. "The global estimated value of illegal sand extraction: Guest post by Luis Fernando Ramadon." SandStories.org, 2021.
v Ramsden, Keegan. "Cement and Concrete: The Environmental Impact." Princeton Student Climate Initiative, 2020.
vi "Rethinking Cement." Beyond Zero Emissions, 2017.

Major components of concrete[vii]

Limestone/Clay/Shale | Crushed Stone | Sand | Gravel | Water | Cement | Admixture

Applications and End Uses:

- Foundations
- Walls
- Bridges
- Roadways

Relevant Certifications

1. Concrete Sustainability Council Certification

Top Global Concrete Producing Countries[viii]

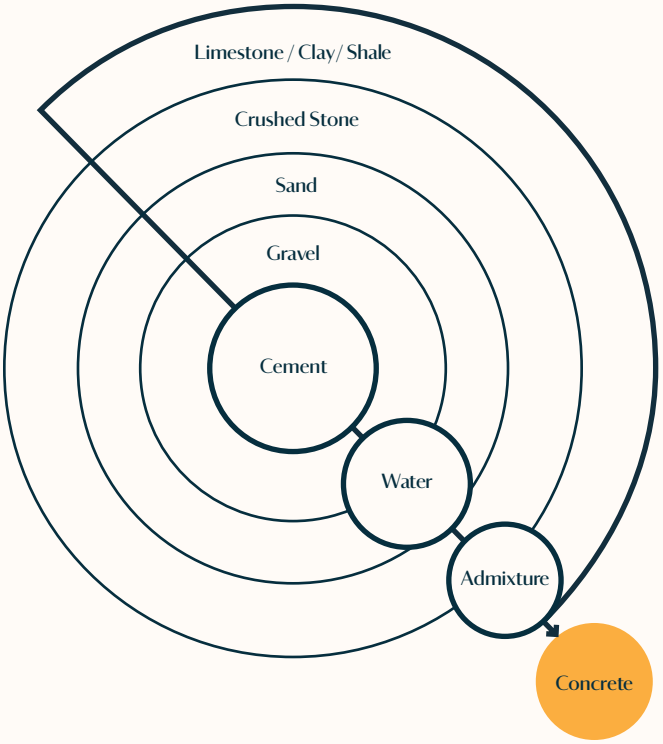
1. China 3.3 billion cubic meters or 35% of global market share
2. United States 333 million cubic meters or 2.7% of global market share
3. India 219 million cubic meters or 2.3% of global market share

Top Concrete Exports by Country (Concrete or of artificial imports by country in 2021, U.S. dollars, units kilograms)[ix]

1. China 990 million kg valued at $2.8 billion
2. European Union 729 million kg valued at $1.1 billion
3. Spain 435 million kg valued at $816 million
4. Vietnam 243 million kg valued at $502 million

Top Concrete Imports by Country (Concrete imports by country in 2021, U.S. dollars, units kilograms)[x]

1. United States 1.8 billion kg valued at $3 billion
2. Canada 212 million kg valued at $341 million
3. European Union 338 million kg valued at $338 million
4. United Kingdom 214 million kg valued at $293 million



vii Gagg, Colin. "Cement and concrete as an engineering material: An historic appraisal and case study analysis." Engineering Failure Analysis, 2014.
viii "Global Concrete Report 2023." Global Cement Magazine.
ix "Top exports of articles of cement, of concrete or of artificia exports by country in 2021." World Bank, World Integrated Trade Solution, Export data for HS Code 681099.
x "Top imports of articles of cement, of concrete or of artificia exports by country in 2021." World Bank, World Integrated Trade Solution, Import data for HS Code 681099.

Material Expert Analysis

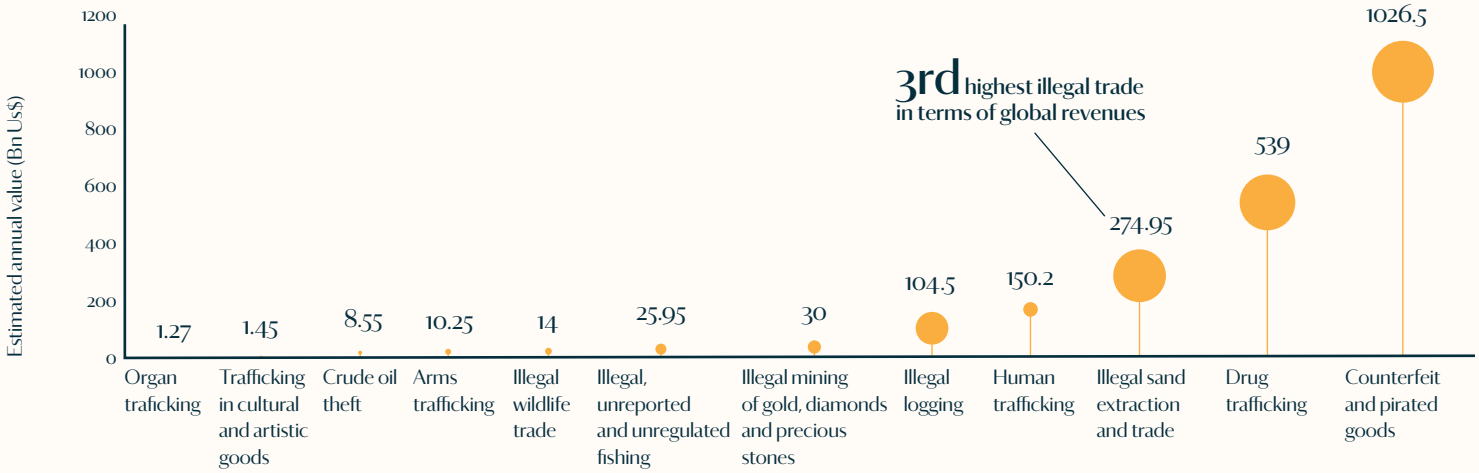
Dr. Chris Hackney, Senior Lecturer, School of Geography, Politics and Sociology at Newcastle University, United Kingdom

"To see the world in a grain of sand" – little did William Blake know when he wrote these lines in 1803 that come the 21st Century, sand would be the second-most mined mineral in the world with an estimated 50 billion tonnes extracted every year (UNEP, 2014,[xi] 2022[xii]). It is such a vital component of modern life; used extensively in concrete production (which represents almost half of all human-made mass on the planet; Elhacham et al. 2020[xiii]), as well as glass production, and infrastructure projects, amongst many other uses.

At a global level, the vast majority of sand and aggregates consumed within nation states is extracted within their own borders. Despite global datasets reporting national level demand, consumption, and trade, the supply chains associated with the extraction of this raw material are less transparent. This is, in part, a result of the lack of an international regulatory framework covering the extraction of sand and aggregates – unlike that which exists for other extracted materials such as gold, oil, and gas. The devolution of regulation to the national level means there is a global tapestry of frameworks that vary in their efficacy and stringency in terms of regulating labour, welfare, and environmental impact concerns around aggregate extraction.

In many parts of the world, so-called 'sand mafias' control much of the aggregate supply chain, with sand being extracted from beaches, rivers, and lakes under cover of night and, sometimes, through the use of force and violence (Hoffman 2021[xiv]). Research has shown that the illegal trade in sand is valued as the third-highest illegal trade, with global revenues estimated between $199.88 and $349.98 billion (Ramadon, 2020[xv]). The nature of this illegal trade relies on poorly regulated labour forces, often resulting in forced and child labour (Da and Le Billon,[xvi] 2022; Bari and Hague, 2022[xvii]). Forced labour has been exposed across sand supply chains across India, Morocco, and Sierra Leone (Bari and Haque, 2022[xviii]; ILO, 2019; U.S. Department of Labor, 2020[xix]) and is likely prevalent more widely where sand mafias and inefficient regulation exist. Given the relative lack of international trade in this commodity, efforts to improve and increase regulation at the national level is therefore key to ensuring greater worker rights and improved labour welfare within sand supply chains.

There is a need for more "robust qualitative understanding and quantification of the physical system" (Torres et al., 2021, p.645[xx]), including more mapping of the sand supply chains and identifying groups involved at all levels of the sand network. This work is necessary to ensure that sand supply chains remain resilient to the growing threat of illicit actors who may seek to take advantage of high demand and relatively inefficient local regulation of the sand sector. In regions of the world facing growing pressures of development and urbanisation and where access to alternative materials or alternative reduced-sand designs for buildings may not be available or financially viable, the risk of exploitation in the workforce and supply chains is likely high.



xi "Sand, rarer than one thinks." GRID-Geneva, United Nations Environment Programme, Geneva, Switzerland, 2014.
xii "2022 Sand and sustainability: 10 strategic recommendations to avert a crisis." GRID-Geneva, United Nations Environment Programme, Geneva, Switzerland, 2022.
xiii. Elhacham, E., et al. "Global human-made mass exceeds all living biomass." Nature, 2020.
xiv Hoffman, M.P. "Digging for sand after the revolution: mafia, labor and shamanism in a Nepali sand mine." Dialectic Anthropology, 2021.
xv Ramadon, L.F. "Water Resources and mining: a study on sand extraction in the Guandu River Basin, master's dissertation." State University of Rio de Janeiro, 2020.
xvi Da, S. and Le Billon, P. "Sand mining: Stopping the grind of unregulated supply chains." The Extractive Industries and Society, 2022.
xvii Barri, E. and Haque, S.E. "Legal and Illicit Sand Mining Practice in Bangladesh: Exploring Supply Chain and its Value." Journal of Illicit Economies and Development, 2022.
xviii Ibid.
xix "Child labour in mining and global supply chains." International Labour Organization, 2019.
xx Torres, A., et al. "Sustainability of the global sand system in the Anthropocene." One Earth, 2021.

"There is a pressing need to address our gap in understanding around labour markets, worker welfare, and illicit supply networks around the world to ensure the global sand network is sustainable, fair, and just for all involved."

Dr. Chris Hackney

Material Overview: Glass

Glass is a transparent building material and yet its supply chain has no transparency. There are no relevant certifications or third-party supply chain audits for fair labor in this ubiquitous building material.

As a composite material, glass is comprised of raw materials that are at high risk of forced and child labor that occurs during mining and extraction. There are currently no industry standards that include third-party audited labor inputs specific to glass.

Glass is integral to modern construction, used for facades, cladding, and insulation. It is made by melting raw materials such as sand, soda ash, and limestone at very high temperatures, typically around 1700°C (3090°F). These raw materials are at high risk of forced and child labor. In low-and middle-income economies, sand, gravel, and crushed stone mining is frequently undertaken by artisanal miners who rely on this type of activity for their livelihoods. The informal nature of these mines means they are unregulated and labor standards are not enforced, increasing risk.

- Silica, soda ash, and limestone are the main components of glass and all are at high risk of forced labor.
- In quarries, increased sub-contracting, temporary labor, and a large migrant workforce that extracts materials used in glass production increases the risk of forced labor occurring. (Verisk Maplecroft)

For additional information, please see silica in the minerals section.

Components of Glass[i]

Sand | Soda Ash | Limestone

Applications and End Products:

- Building
  (Windows and Façades)
- Interior Design
  (Mirrors, Partitions, Stove tops, Tables, Shelves, Lighting, and Insulation)
- Renewable Energy
  (Solar-energy glass and Wind turbines)

Relevant Certifications

None

i "What is Glass?"
Glass Alliance Europe.

Top Glass Producing Countries[ii]

1. China 51%
2. Asia and Oceania 12%
3. Europe 11%

Float glass is a method of producing flat glass. In 2023, the global flat glass market size was valued at $305.81 billion in 2023. The construction market is the majority user of flat glass, followed by the automobile industry.[iii]

Distribution of Float Glass Exports Worldwide[iv]

1. China 13%
2. Germany 10.5%
3. United States 7.1%

Global Float Glass Exports by Country (Value in U.S. dollars)[v]

1. China $1.4 billion or 18% of global market
2. Germany $779 million or 10.2% of global market
3. United States $566 million or 7.41% of global market

Global Float Glass Imports by Country (Value in U.S. dollars)[vi]

1. China $429 million or 5.6% of global market
2. Canada $371 million or 4.9% of global market
3. India $309 million or 4.1% of global market

ii "Distribution of float glass production worldwide in 2019 by region." Statista, 2024.
iii "Flat Glass Market Size, Share & Trends Analysis Report By Product." Grand View Research.
iv "Distribution of float glass exports worldwide in 2021, by country." Statista, 2024.
v "Float Glass." OEC.world, Observatory of Economic Complexity (OEC).
vi Ibid.

Material Expert Analysis

Michael Min Ra, Principal/Director/Co-Founder, VIA/Front

Glass is the single-most-important material in building and transportation architecture today. There are no other substitutes that can protect us from wind, rain, fire, heat, cold, and even blasts and projectiles imposable on a transparent medium. Albeit less common, glass can also be engineered to be a transparent primary structure in lieu of wood, concrete, or steel. Without impact to breakage, it can last forever. Unlike transparent but synthetic materials like acrylic that have inherent toxicity, glass is made from heat and naturally abundant ingredients available without deep mining. Its main ingredient is silica sand. While abundant, the demand for silica has grown exponentially as economic expansion drastically accelerated in the highest population zones globally. Despite its relative ecological benefits, the shear vastness of the demand largely shared with the concrete construction creates its own problematic impacts to humans and ecologies of which the consequences are yet to be visible enough. The fabrication of glass is highly visible, as these works are done in a factory where outsider visitors are frequent. The procurement of the raw materials that comprise glass, however, is much more opaque. The means, methods, and processes of this extraction are not readily visible nor are there means of tracing and verifying the ethics of these earlier stages of glass production.

There is some elegance to be found in the material of glass for its re-usable properties. However, when mixed with other materials such as tinting, coating, printing, and laminating, complication and limitations arise in the recycling process becoming more energy-intensive and reducing its end-use options.

Due to more stringent energy code compliance requirements for building being adapted throughout the world, there is some segmental trend to reduce the use of glass while the glazing industry is developing new techniques to improve the thermal and solar protective qualities allowing for continued demand for its use.

"The fabrication of glass is highly visible as these works are done in a factory where outsider visitors are frequent. The procurement of the raw materials that comprise glass, however, is much more opaque. The means, methods, and processes of extraction are not readily visible. There are no means of tracing and evaluating the ethics of earlier stages of glass production."

Michael Min Ra

Material Overview: Metals

Metals such as steel, copper, and aluminum are used widely in construction due to their strength and durability; yet they are fraught with forced labor and are accelerating climate change.

The mining of metals such as copper, cobalt, iron ore, and bauxite has been linked to forced labor abuses, particularly in countries where the mining sector has come under the control of organized criminal organizations or the military. In some countries, high rates of migrant and contracted workers at mine sites increases forced labor risks. There are widespread reports of children and adults being made to work in hazardous and unhealthy conditions for long periods of time. A significant proportion of the world's metals are extracted from artisanal mines, increasing the likelihood of forced labor (Verisk Maplecroft).

Relevant Certifications

1. Aluminum Stewardship Initiative Chain of Custody Standard
2. Copper Mark (Zinc Mark, Molybdenum Mark)
3. London Metal Exchange Responsible Sourcing
4. Responsible Mineral Initiative
5. ResponsibleSteel Certification

Material Expert Analysis

John Morrison, Chief Executive Officer, Institute for Human Rights and Business (IHRB)

The shift to renewable energy will require significantly more copper, silicon, rare earth metals, and molybdenum for power generation and transmission. The batteries essential for storing and transporting this energy will depend on Energy Transition Minerals (ETMs) such as lithium, graphite, cobalt, nickel, and manganese, unless alternative minerals are developed. Alongside copper, aluminum and zinc will see the largest absolute increases in demand as part of the associated infrastructure, likely surpassing total historical production by 2050.

Three key factors will influence ETM demand: the pace and depth of climate transitions, technological advancements that alter the types and quantities of ETMs required, and the circularity of ETM use – how effectively existing minerals can be reused or recycled. According to projections by the International Energy Agency (IEA) and the World Bank, by 2030, global demand compared to 2022 levels could see a 58% increase in aluminum, 260% in cobalt, 160% in copper, 400% in graphite, and over 500% in lithium. By 2050, these increases could grow further, with some minerals like cobalt and lithium potentially rising 13 to 40 times their current production levels.

While coal and iron ore mining are widely distributed globally, ETM mining is more concentrated. For example, the Democratic Republic of Congo (DRC) produces nearly three-quarters of all cobalt, Indonesia nearly half of all nickel, Australia dominates lithium production, China leads in zinc, and Chile in copper. However, the growing demand and geopolitical rivalries will likely diversify these sources, with new supply chains emerging in Latin America, Africa, and parts of Asia.

A significant concern is that about 54% of potential new mining projects could affect indigenous lands, potentially leading to conflicts over sustainability and rights. Additionally, China's dominance in refining these minerals, particularly copper, nickel, cobalt, and rare earth elements, poses challenges. OECD countries are increasingly considering securing their own supply chains and reducing reliance on Chinese production, as highlighted by incentives in the U.S. Reduction Act. Any major trade dispute, especially between China and the U.S., could disrupt the flow of ETMs, impacting global climate transition efforts.

Companies have yet to fully address their upstream social impacts, such as corruption, worker rights, and local development – issues that have been partially addressed in the high-carbon extractive sectors. Despite familiarity with concepts like social license and revenue-sharing, these practices haven't been adequately integrated into the renewable energy sector. The rush to achieve Net Zero, combined with global trade and security concerns, risks lowering standards in new mining sectors. Just climate transition strategies must include ETMs, considering their effects on supply chains and the livelihoods they impact, particularly for vulnerable communities.

> "The rush to achieve Net Zero, combined with global trade and security concerns, risks lowering standards in new mining sectors."
>
> John Morrison

Metals

Aluminum

Top Aluminum Producing Countries[ii]
Distribution of aluminum smelter production share worldwide in 2023, by country[iii]

1. China 41 million metric tons, 51%
2. India 4.1 million metric tons, 6%
3. Russia 3.8 million metric tons, 5%

Global Aluminum Exports (Value in U.S. dollars)[iv]

1. China $42.1 billion
2. Germany $21.1 billion
3. United States $14.5 billion

Global Aluminum Imports by Country (Value in U.S. dollars)[v]

1. United States $36.7 billion
2. Germany $26.6 billion
3. China $11.7 billion

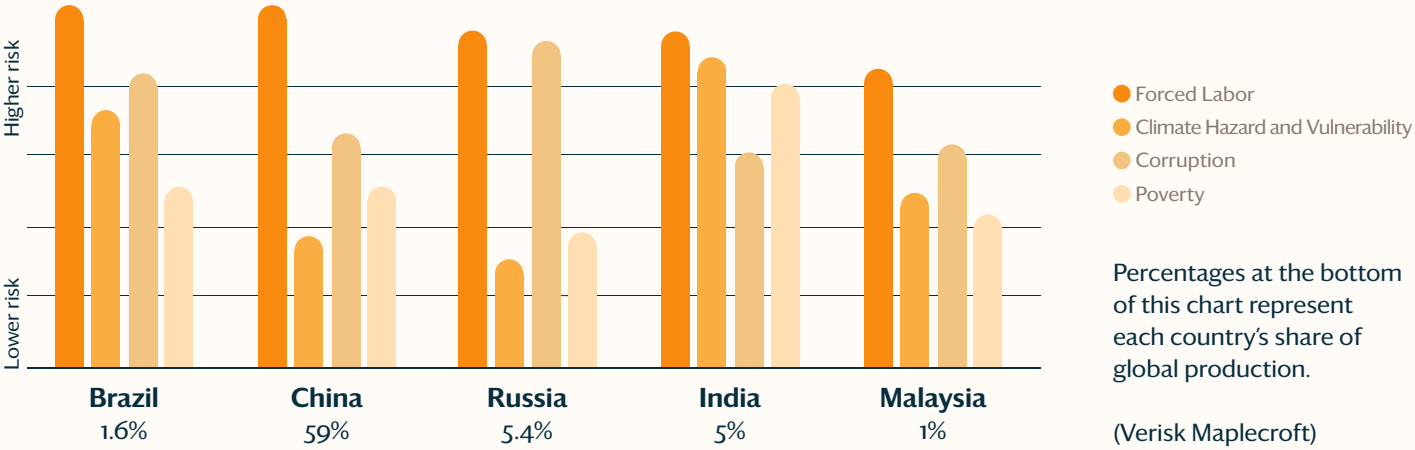
Aluminum is a lightweight metal that is a common building material as it is strong, flexible, rustproof, and can be recycled repeatedly. According to the Aluminum Association, an estimated 60% of the aluminum used in buildings today has been recycled. It is a key component of renewable energy products like wind turbines and solar panels. It is at high risk of forced labor, again demonstrating that while environmental sustainability increases with recyclability, it is incongruous with forced labor.

- The demand for aluminum is expected to increase by 40% by 2030.[i] This increase is driven by the shift to clean energy technologies.
- Aluminum is listed as a priority sector for the enforcement of the Uyghur Forced Labor Prevention Act (UFLPA), which blocks products made with forced labor from entering the United States.

Applications and End Products:

- Facades
- Roofs
- Walls
- Windows
- Solar Panels
- Siding
- HVAC Systems
- Finishes

Aluminum Forced Labor and related risks in major countries of origin



Percentages at the bottom of this chart represent each country's share of global production.

(Verisk Maplecroft)

Metals

Cobalt

More than 70% of the world's cobalt comes from the Democratic Republic of the Congo (DRC), where large and small-scale mining operations are often reliant on forced labor.[vi]

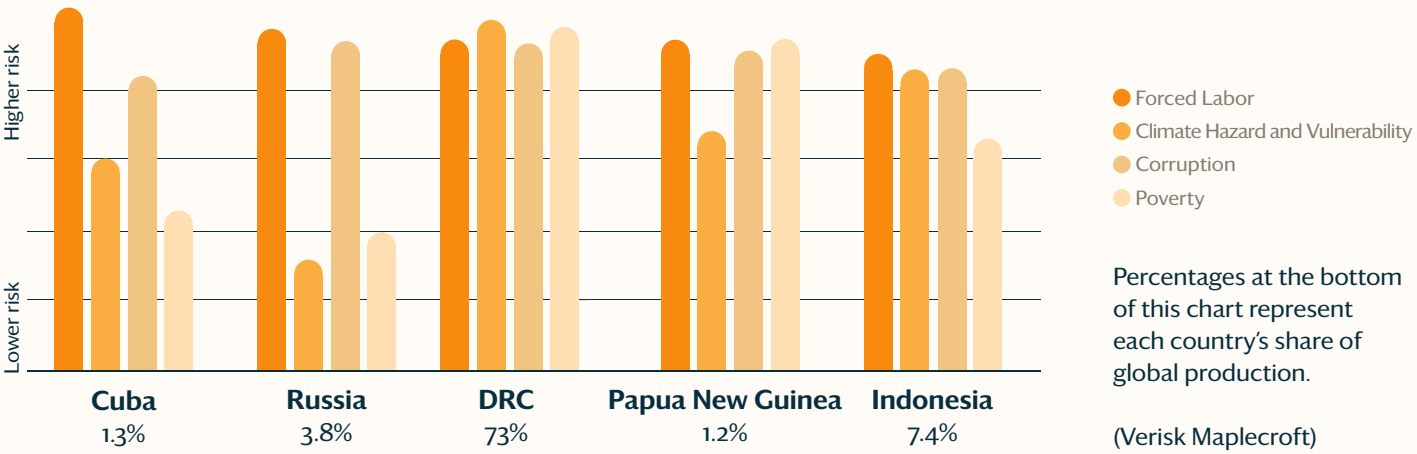
Many raw materials are extracted together, such as cobalt and copper, although they ultimately deliver different final products. Cobalt-copper mines are increasingly under public scrutiny for their high risk of forced and child labor in producing key elements for renewable batteries, solar panels, roofing systems, pipes, and cladding.

- In the DRC, cobalt is mined in large industrial mines and by small-scale artisanal miners. Children perform dangerous work in these small mines, like digging tunnels, carrying heavy loads, and crushing ore.[vii]
- One-third of all cobalt produced in the DRC is extracted from artisanal mines, for which there is little or no oversight.[viii]

Applications and End Products[ix]**:**

- Batteries
- Corrosion and Wear-Resistant Alloys
- Paints, Dyes, and Pigments
- Hardmetals

Colbalt Forced Labor and related risks in major countries of origin



Percentages at the bottom of this chart represent each country's share of global production.

(Verisk Maplecroft)

Top Global Cobalt Production by Country[x]

1. Democratic Republic of the Congo 170,000 metric tons
2. Indonesia 17,000 metric tons
3. Russia 8,800 metric tons

Global Cobalt Exports by Country[xi]

1. Democratic Republic of the Congo 57.6%
2. Canada 6%
3. United States 4.3%

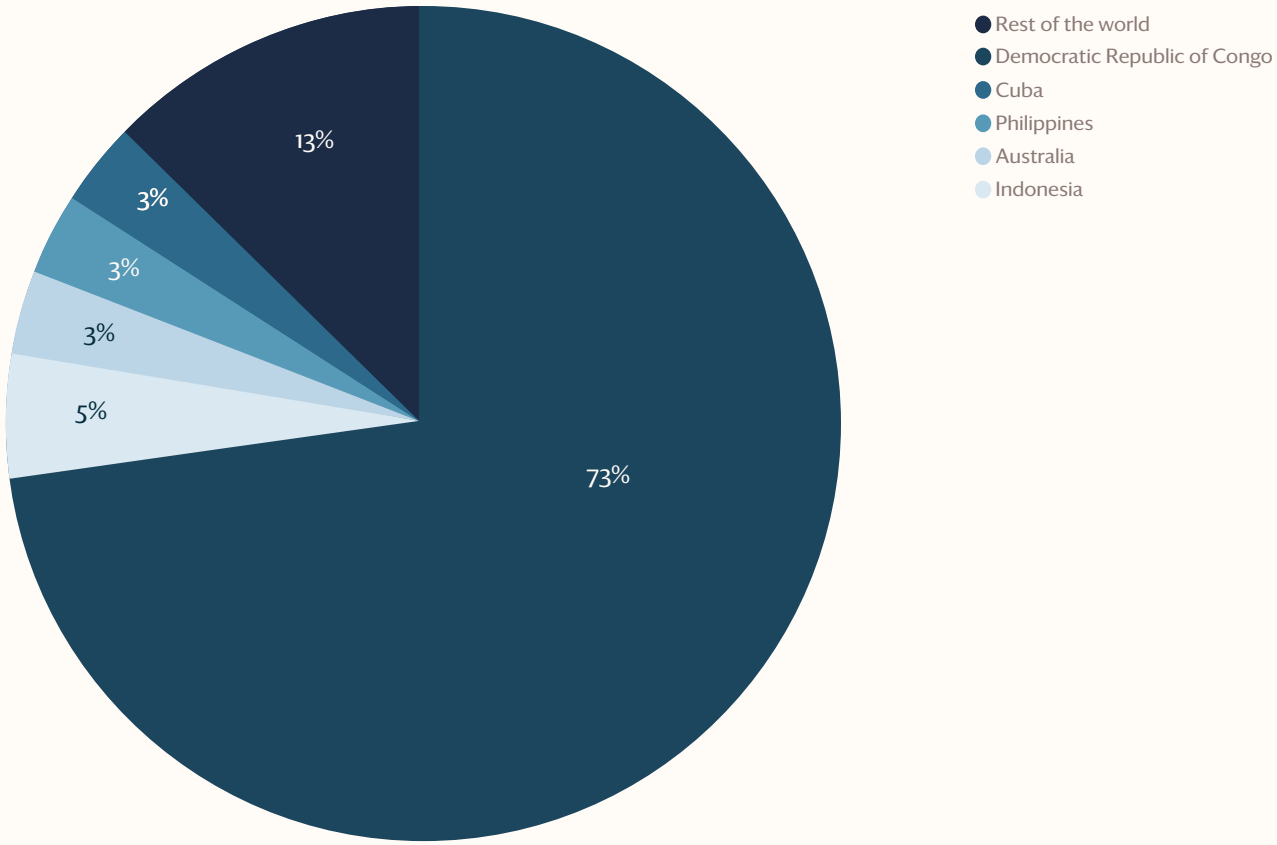
Global Cobalt Imports by Country[xii]

1. China 63%
2. Japan 6%
3. United States 5%

Leading cobalt mine production by country in 2023[xiii]

1. Kisanfu Mine (DRC) 25,500 metric tons
2. Metalkol RTR Project (DRC) 22,610 metric tons
3. Tenke Fungurume Mine (DRC) 22,500 metric tons

Distribution of mined cobalt supply worldwide in 2022, by country[xiv]



Source: Benchmark Minerals; Cobalt Institute and Statista

Metals

Copper

Top Copper Producing Countries[xix]

1. Chile 5 million metric tons
2. Peru 2.6 million metric tons
3. Democratic Republic of the Congo 2.5 million metric tons
4. China 1.7 million metric tons

Copper Exports (Value in U.S. dollars)[xx]

1. Chile $21.6 billion
2. Democratic Republic of the Congo $16.8 billion
3. Germany $15.9 billion

Copper Imports (Value in U.S. dollars)[xxi]

1. China $68.7 billion
2. United States $15.6 billion
3. Germany $15.3 billion

Use of Copper and Copper Alloys Products in the U.S. by Purpose[xxii]

1. Building construction, 45%
2. Electric and electronic products, 22%
3. Transportation equipment, 16%
4. Consumer and general products, 10%
5. Industrial machinery and equipment, 7%

Copper, a versatile, recyclable material, is valued for its conductivity and resistance to corrosion, along with its flexibility. It is often used for wiring, heating systems, piping, roofing, solar panels, electronics, and batteries. In fact, approximately half of the copper supply worldwide is used in buildings.[xv]

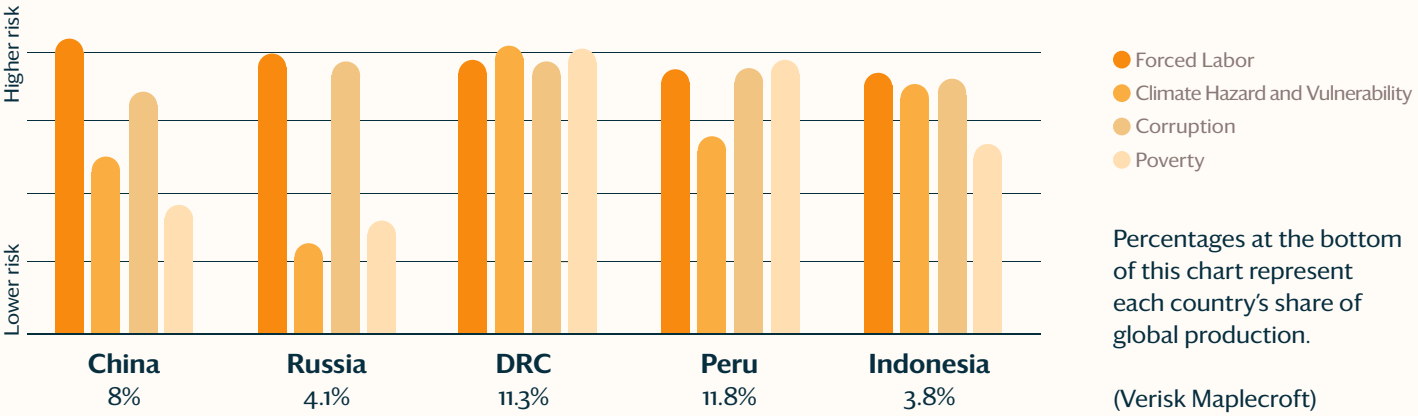
Copper manufacturing is a complicated and multi-step process. It begins with mining of the ore, including copper oxide and copper sulfide.

- Global copper production has seen steady growth over the past decade, rising from 16 million metric tons in 2010 to an estimated 22 million metric tons to meet the growing demand of the construction industry.[xvi]
- 65% of undeveloped copper reserves and resources in close proximity to biodiverse conservation areas.
- 47% in close proximity to Indigenous Peoples' land.
- 45% of all copper in the U.S. is used in the construction sector.
- Estimated 60% increase in global raw material extraction by 2060.[xvii]

Applications and End Products[xviii]:

- Heating and cooling systems
- Cladding
- Flashing
- Refrigeration
- Electronics
- Copper wiring, piping, and tubing
- Construction hardware
- Gutters and downpipes

Copper Forced Labor and related risks in major countries of origin



Percentages at the bottom of this chart represent each country's share of global production.

(Verisk Maplecroft)

Metals

Steel & Iron

Top Producing Countries, Raw Steel[xxviii]

1. China 1 billion metric tons or 52.6% of global market
2. India 140 million metric tons or 7.4% of global market
3. Japan 87 million metric tons or 4.6% of global market

Global leading steel exporters in 2022, by country[xxix]

1. China 68.1 million metric tons
2. Japan 31.7 million metric tons
3. South Korea 25.5 million metric tons

Global Raw Steel Imports by Country (metric tons)[xxx]

1. United States 28.9 million metric tons
2. Germany 21 million metric tons
3. Italy 20.2 million metric tons

Steel and iron account for 95% of all the metal produced globally.[xxiii] Steel is the most frequently used metal in construction, and more than half of the world's steel production is used by the construction industry.[xxiv]

There are many points of potential forced labor along the steel supply chain due to the hazardous conditions and lack of transparency ranging from extraction and smelting to production, rolling, and erecting. The risk of forced labor exists at each point of this process.

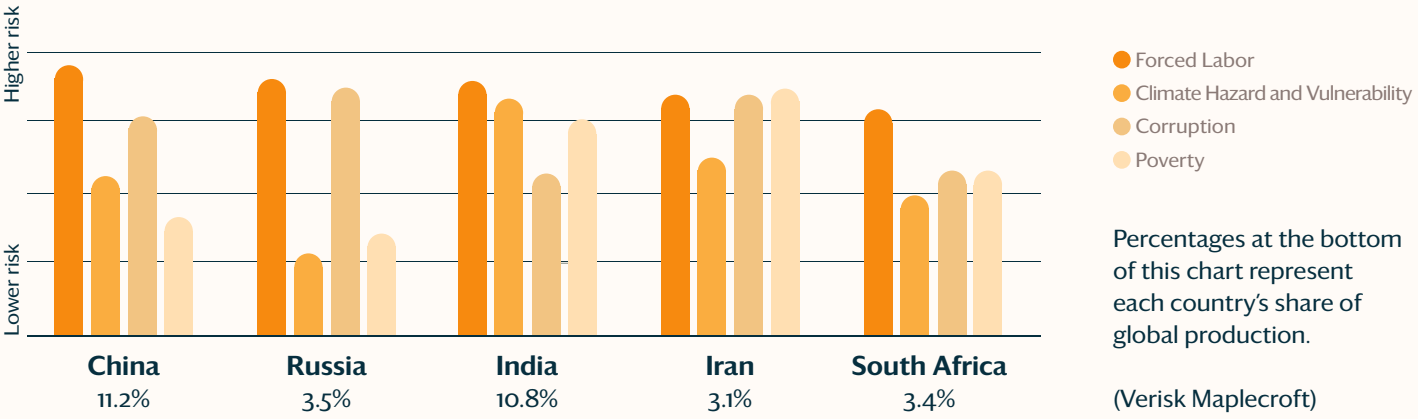
- Steel has a large carbon footprint and accounts for 7% of global greenhouse gas emissions.[xxv]
- Over the next 25 years, the demand for steel and iron is projected to increase by 40%.[xxvi]
- Global steel production averages 2 billion tons of crude steel every year, approximately half of which comes from Chinese mills and are at high risk of forced labor.[xxvii]

Applications and End Products:

Buildings
- Metal roofing
- Steel beams
- Reinforcing steel
- Mounting brackets

Infrastructure
- Bridges
- Steel safety barriers for roads, lighting, and high voltage pylons
- Railings and railways

Iron Forced Labor and related risks in major countries of origin



Percentages at the bottom of this chart represent each country's share of global production.

(Verisk Maplecroft)

Pig Iron

Pig iron is the product that results from smelting iron ore with a high-carbon fuel such as coke.[xxxi]

Top Pig Iron Production by Country[xxxii]

1. China 890 million metric tons or 68.5% of global market
2. India 87 million metric tons or 7% of global market
3. Japan 63 million metric tons or 4.8% of global market

*Percentages based on total world production of 1.3 billion metric tons

Top Iron Ore Production by Country[xxxiii]

1. Australia 960 million metric tons or 38.4% of global market
2. Brazil 440 million metric tons or 17.6% of global market
3. China 280 million metric tons or 11.2% of global market

*Percentages based on total world production of 2,500,000 thousand metric tons (rounded)

Global Iron Ore Exports by Country (Value in U.S. dollars)[xxxiv] and Distribution of Exports[xxxv]

1. Australia $91 billion or 56.4% of global market
2. Brazil $30.6 billion or 19% of global market
3. Canada $6.6 billion or 4.1% of global market

Global Iron Ore Imports by Country (Value in U.S. dollars)[xxxvi] and Distribution of Imports[xxxvii]

1. China $173.6 billion or 70.1% of global market
2. Japan $18 billion or 7.3% of global market
3. South Korea $12.1 billion or 4.9% of global market

Relevant Certifications

1. Aluminum Stewardship Initiative Chain of Custody Standard
2. Copper Mark (Zinc Mark, Molybdenum Mark)
3. London Metal Exchange Responsible Sourcing
4. Responsible Mineral Initiative
5. ResponsibleSteel Certification

i "Exposing Exploitation in Global Supply Chains Series."
U.S. Department of Labor, Bureau of International Labor Affairs.
ii "Major smelter producers of primary aluminum in 2023." Statista, 2024.
iii "Distribution of aluminum smelter production share worldwide in 2023, by country." Statista, 2024.
iv "Leading Exporters of Aluminum and Aluminum Producing Countries." Statista, 2022.
v "Leading importers of aluminum and aluminum products worldwide in 2022, by country." Statista, 2024.
vi "2024 List of Goods Produced by Child Labor or Forced Labor." U.S. Department of Labor,
Bureau of International Labor Affairs,2024.
vii Ibid.
viii "Opportunities for Businesses to Promote Child Rights in Cobalt Artisanal and Small-Scale Mining."
Save the Children and The Centre for Child Rights and Business, 2021.
ix "Cobalt Statistics and Information." USGS, 2024.
x "Leading countries based on cobalt mine production worldwide in 2023." Statista, 2024.
xi "Distribution of cobalt exports worldwide in 2021, by country." Statista, 2024.
xii "Distribution of cobalt imports worldwide in 2021, by country." Statista, 2024.
xiii "Leading cobalt mines worldwide in 2023, by production volume." Statista, 2024.
xiv "Distribution of mined cobalt supply worldwide in 2022, by country." Statista, 2024.
xv Copper Development Association.
xvi "Mine production of copper worldwide from 2010 to 2023." Statista, 2024.
xvii "The global demand for copper and the human rights challenges ahead." The Institute for Human Rights
and Business (IHRB), 2021.
xviii Copper Development Association.
xix "Major countries in copper mine production worldwide in 2023." Statista, 2024.
xx "Leading exporters of copper and copper products worldwide in 2022, by country." Statista, 2024.
xxi "Leading importers of copper and copper products worldwide in 2022, by country," Statista, 2024.
xxi "Use of copper and copper alloys products in the United States in 2023, by purpose." Statista, 2024.
xxiii "Iron and Steel Statistics and Information." U.S. Geological Survey, USGS.
xxiv Moynihan, Muiris and Allwood, Julia, "The Flow of Steel into the Construction Sector."
Resources, Conservation, and Recycling, 2012.
xxv U.S. Department of Energy Announces $28 Million to Decarbonize Domestic Iron and Steel Production."
U.S. Department of Energy, ARPA-E (Advanced Research Projects Agency - Energy), 2024.
xxvi Ibid.
xxvii "Steel industry in China - statistics and facts." Statista, 2022.
xxviii "Mineral Commodity Summaries 2024." U.S. Geological Survey, U.S. Department of the Interior, 2024.
xxix "World leading steel exporters in 2022, by country." Statista, 2024.
xxx "World leading steel importers in 2022, by country." Statista, 2024.
xxxi World Steel Association.
xxxii "Mineral Commodity Summaries 2024." U.S. Geological Survey, U.S. Department of the Interior, 2024.
xxxiii Ibid.
xxxiv "Leading iron ore exporting countries worldwide in 2023, based on value." Statista, 2024.
xxxv "Distribution of global iron ore exports in 2023, by major country." Statista, 2024.
xxxvi "Leading iron ore importing countries worldwide in 2021." Statista, 2024.
xxxvii "Distribution of global iron ore imports based on value in 2021, by major country." Statista, 2024.

Material Overview: Minerals

Minerals are essential components in construction, electronics, and paints, but their extraction is often linked to forced labor, child labor, and environmental degradation.

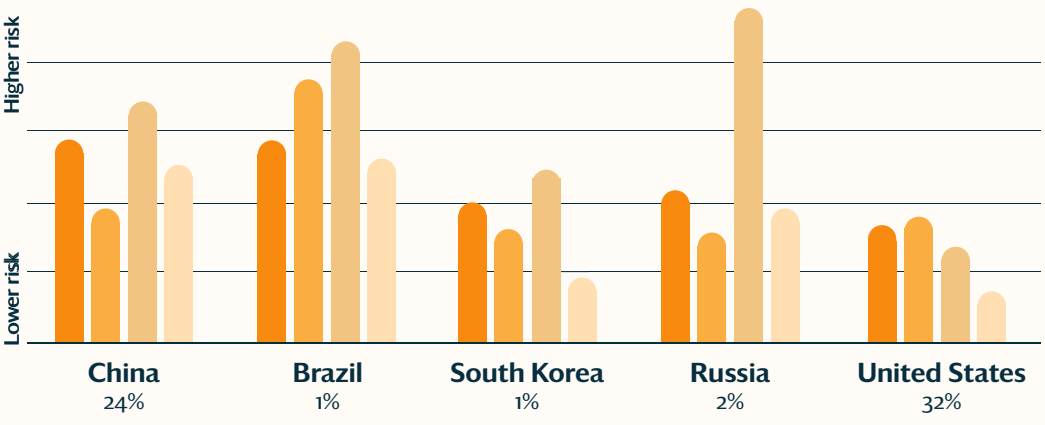
Minerals such as mica, silica, and gypsum are raw materials used across many industries.

- Minerals such as mica, silica, and graphite enhance a variety of key building materials. They often originate from countries with documented cases of forced labor, child labor, corruption, and poverty. A lack of safety enforcement can lead to accidents during the extraction and transport of these commodities, resulting in serious injuries and death. (Verisk Maplecroft)
- In top producing countries, poverty drives child exploitation and has resulted in lethal incidents in unregulated mines. (Verisk Maplecroft)
- Top producers of minerals have been linked to forced labor allegations. Mining companies have been associated with state-sponsored work programs, which transfer workers to locations with mineral deposits. Workers in these programs cannot refuse employment assignments nor can they freely exit jobs. (Verisk Maplecroft)
- Corruption can encourage local officials to allow companies to operate without regard for environmental impacts. Mining practices, especially in top-producing countries, contribute to deforestation, soil erosion, and water contamination due to inadequate wastewater handling. (Verisk Maplecroft)

Relevant Certifications

1. Initiative for Responsible Mining Assurance Certification
2. Responsible Mica Initiative
3. Responsible Minerals Initiative

Minerals Forced Labor and related risks in major countries of origin



Forced Labor
Climate Hazard and Vulnerability
Corruption
Poverty

Percentages at the bottom of this chart represent each country's share of global production of mica, silica, and graphite.

(Verisk Maplecroft)

Minerals

Gypsum

Top Gypsum Producing Countries[ii]

1. United States 22 million metric tons or 13.75% of market share*
2. Iran 16 million metric tons or 10% of market share*
3. China 12 million metric tons or 7.5% of market share* of production

*Percentages based on total world production of 160 million metric tons

Top Exporting Gypsum Counties (Value in U.S. dollars)[iii]

1. Thailand, $225 million or 13.1% of the market share
2. Spain $195 million or 11.4% of market share
3. Germany $146 million or 8.5% of market share

Top Gypsum Importing Countries (Value in U.S. dollars)[iv]

1. United States $128 million
2. India $125 million
3. Nigeria $97 million

Gypsum - a soft mineral embedded in rock - is a versatile construction material used for making Portland cement, drywall, and to build roads and highways.

- Gypsum production: The U.S. leads global gypsum production with 22 million metric tons, accounting for 13.75% of the market share, while Iran produces 16 million metric tons (10% of the market).[i]
- Gypsum waste: Unfortunately, a large proportion of gypsum waste is currently held in landfills worldwide, including building plaster, gypsum blocks and plasterboard waste; the latter being the most common recyclable gypsum waste generated in Europe.

Applications and End Products:

- Drywall
- Casting
- Packaging
- Wallboard
- Plaster
- Tiles
- Blocks

Minerals

Mica

Top Mica Exporting Countries (Crude mica and mica rifted into sheets or split)[ix] (Value in U.S. dollars)

1. India $17 million
2. Madagascar $16.4 million
3. Nigeria $3.6 million

Top Mica Importing by Country[x] (Value in U.S. dollars)

1. China $71.2 million; 170 million kg
2. European Union $5.6 million; 6.9 million kg
3. Japan $5 million; 6.7 million kg
4. Germany $3.6 million; 4.5 million kg

The mining of mica, a mineral used globally for everything from paint to cosmetics to electronics – exposes children to hazardous working conditions as they navigate narrow, collapsing shafts and work with bare hands, leading to cuts, infections, and severe respiratory illness from dust exposure. Children make up 62% of Madagascar's mica mining workforce, highlighting the urgent need for transparency and ethical reform in the supply chain.[v]

- India and Madagascar together are responsible for 40% of global mica exports, with 22,000 children in India and 10,000 children in Madagascar involved in mica mining, often working in unsafe conditions.[vi]
- Mica's reflective qualities are crucial in cosmetics, paints, electronics, and building materials, but the industry is rife with child labor and dangerous conditions for workers in top producing countries.
- China is the leading producer of mica and silica.[vii]

Applications and End Products[viii]:

- Joint compound
- Paint
- Transformers and other electrical components
- Plastic sound proofing insulation
- Architectural concrete
- Glass
- Plastics
- Rubber
- Thermal insulation

Material Expert Analysis
Fanny Frémont, Executive Director, Responsible Mica Initiative

Mica is a family of 37 minerals and is a crucial resource used across various industries around the world. Mica's reflective optical properties are utilized in cosmetics as well as in paint and coatings. Its exceptional natural electrical and thermal insulation properties make mica a key component in the electronics, cables, and automotive industries. It is also used as a functional filler in plastics and building materials such as wall boarding compounds, additive to concrete, roofing materials, floor and wall tiles, for example, and as a lubricant in the oil and gas drilling sector.

Mica is mined in more than 35 countries worldwide. India and Madagascar combined are responsible for 40% of global mica exportations. In these two countries, mica is essentially extracted or collected through artisanal and small-scale mining (ASM) and is associated with issues such as child labor, poor working conditions, illegal mining, and a high economic dependency. The combination of poverty, low prices paid to mica pickers, the lack of a formalized market, and supply chain transparency, leaves the mica supply chain susceptible to weak governance and ill-intentioned actors, including situations of debt-bondage. In India, it is estimated that up to 22,000 children are engaged in mica collection[xi]. In Madagascar, 10,000 people, or half of the mica pickers, are estimated to be child laborers[xii]. Even more than adults, these children can be affected by respiratory illnesses, injuries and accidents, and sexual and economic exploitation. Their contribution can range from collecting mica at the bottom of narrow tunnels, to sorting it or carrying bags far too heavy for them.

The high proportion of illegal mica collection means that data on mining production is a poor reflection of reality, as it does not include mica extracted from ASM. Exportation figures are therefore often more relevant than production ones (UN Comtrade database, 2022 figures).

- Madagascar accounts for 54% of global mica sheet exportations in volumes, and 17% of mica scraps. It is estimated that 10,000 children (half of the workers) are engaged in mica mining (Terre des Hommes Netherlands).
- India accounts for 24% of global mica sheet exportations in volumes, and 81% of mica scraps.

Once collected, mica is transported to processing units in the same countries, where it is sorted, crushed, and sieved before being exported largely to China (>80%), where it is further processed before being exported again worldwide.

The efforts made over the last few years by various players in the mica field have led to international awareness-raising, a new law in the Indian state of Jharkhand, better living conditions for certain families, and the development of industry standards and worker training. However, to accelerate the implementation of scalable, responsible supply chains, and to do so in a sustainable way, the key ways forward remain a joint commitment, new ways of doing business with much more transparency, and the payment of living wages as a determining factor in reducing poverty and combating child labor.

> "In Madagascar, 10,000 people, or half of the mica pickers, are estimated to be child laborers... they can be affected by respiratory illnesses, injuries and accidents, sexual, and economic exploitation. Their contribution can range from collecting mica at the bottom of narrow tunnels, to sorting it or carrying bags far too heavy for them."
>
> Fanny Frémont

Minerals

Silica

Top Silica Production by Country (Industrial sand and gravel[xiii]

1. United States 114 million metric tons
2. China 87 million metric tons
3. Italy 14 million metric tons

Global Silica Exporting by Country (2023, sands and quartz sands)[xiv]

1. United States $742 million; 7 billion kg
2. European Union $124 million; 855 million kg
3. Germany $88 million; 861 million kg
4. Belgium $83 million; 1.3 billion kg

Global Silica Importing by Country (2023, sands and quartz sands)[xv]

1. China $332 million; 6.5 billion kg
2. Canada $273 million; 5.9 billion kg
3. European Union $89 million; 837 million kg
4. Mexico $83 million; 815 million kg

Silica is a mineral found in the earth's crust and is used to make sand, stone, concrete, and mortar, as well as glass, bricks, and artificial stone. It exists in two primary forms: crystalline and non-crystalline (or amorphous). Crystalline silica is commonly found in materials like sand and quartz.

- Activities such as blasting, cutting, chipping, drilling, or grinding these materials can generate dangerous silica dust and expose workers to hazardous environments and silica-related diseases.
- Glass is the most visible end-product that uses silica produced from the molten state.

Applications and End Products:

- Ceramics
- Chemical industry
- Non-slip flooring
- Sand
- Stone
- Concrete
- Mortar
- Glass
- Pottery
- Bricks
- Artificial stone
- Solar panels
- Latex paint
- Drywall joint compound
- Asphalt

i "Mineral Commodity Summaries 2024." U.S. Geological Survey, U.S. Department of the Interior, 2024.
ii "Major countries in gypsum mine production in 2023," Statista, 2024.
iii "Gypsum." OEC.world, Observatory of Economic Complexity (OEC), 2022.
iv Ibid.
v Child Labor in Madagascar's Mica Sector," Terre des Hommes Netherlands, 2019.
vi Ibid.
vii "Mineral Commodity Summaries 2024." U.S. Geological Survey, U.S. Department of the Interior, 2024.
viii "Mica/Uses." Responsible Mica Initiative.
ix "Crude mica and mica rifted into sheets or split exports by country in 2023."
Trade Solution, World Bank, 2023.
x Ibid.
xi "Global Mica Mining And The Impact On Children's Rights." Terre des Hommes, Netherlands, 2016.
xii "Child Labour in Madagascar's Mining Sector." Terre des Hommes, 2019.
xiii "2022 Minerals Yearbook - Silica (Advanced Release), Statista, 2023.
xiv "Silica sands and quartz sands exports by country in 2023." World Integrated Trade Solution, World Bank.
xv "Silica sands and quartz sands imports by country in 2023." Statista, 2024.

A young man looks for copper in the Democratic Republic of the Congo. He is one of about 4,000 young men and children that work as artisan miners. Children as young as eight work in the mine under dangerous conditions.

Material Overview: Paints & Dyes

Key components of paints and dyes are often processed in countries with high risks of corruption and poverty, contributing to forced labor risks and environmental degradation

The global dyes and pigments market has witnessed remarkable growth as it is primarily used in key end-use industries such as textiles, construction, and plastics, to name a few. The textile industry is one of the largest end-users of dyes and pigments, with a wide range of applications in the production of clothing, home textiles, and other textile-based products.[i] The construction industry makes use of paints and dyes in the production of architectural coatings, automotive coatings, and other industrial coatings. The plastics industry is also a significant end-user of pigments, with applications in the manufacturing of packaging products, consumer goods, and industrial components.[ii] This increased utilization of plastics across diverse industries has resulted in a heightened requirement for dyes and pigments.

- In the construction industry, paints and dyes play an important role in protecting building surfaces. However, key ingredients such as chromium, lead, and cadmium, are often processed in countries with high risks of corruption and poverty, which contribute to forced labor risks and environmental degradation. (Verisk Maplecroft)
- In higher-risk countries, there are reports of collusion between companies and local government officials to allow extraction of raw materials used for paint and dyes without following labor laws or obtaining required permits. Situations of poverty can also drive workers toward unregulated employment at unauthorized sites. (Verisk Maplecroft)
- Lax enforcement of labor laws can mean that factories lack effective safety measures. Workers and local communities living near refining sites can suffer serious health consequences by being in proximity to chemicals used in paint and dye production without proper protective clothing. (Verisk Maplecroft)

Applications and End Uses:

- Paints
- Textiles in Interiors and Clothing
- Coatings

Relevant Certifications

None

i "Textiles Industry Data Book - Household Textile, Technical Textile, and Fashion Market Textile Market Size, Share, Trend Analysis, and Segment Forecasts 2020-2030." Grand View Research, 2023.

ii "Plastics Industry Data Book - Plastic Resins, Plastic Additive, Plastic Compounds and Recycled Plastics Market Size, Share, Trends Analysis, And Segment Forecasts, 2023 - 2030." Grand View Research, 2023.

Global Dyes Exports (paints, dyes, varnishes) by Country[iii] (Value in U.S. dollars)

1. Germany $13.9 billion
2. China $11 billion
3. United States $7.9 billion

Global Dyes Imports (paints, dyes, varnishes) by Country[iv] (Value in U.S. dollars)

1. China $6 million
2. Germany $5.8 million
3. United States $5.3 million

Total Value of Paints, Dyes, and Varnishes Imports and Exports[v] (Value in U.S. dollars)

1. Global Dye Imports $91.3 billion (2022)
2. Global Dye Exports $91.3 billion (2022)

iii. "Leading Exporters of Paints, Dyes, and Varnishes Worldwide in 2021." Statista, 2024.
iv "Leading importers of paints, dyes, and varnishes worldwide in 2021, by value." Statista, 2024.
v. "Total value of paints, dyes, and varnishes imports and exports worldwide from 2010 to 2022." Statista, 2024.

The construction industry uses paints and dyes in the production of architectural coatings, among other uses. These paints often carry significant health and environmental hazards. Here, steel is coated for use in a steel building.

Material Expert Analysis

Jonsara Ruth, Co-Founder & Design Director, Healthy Materials Lab
Alison Mears, Co-Founder and Co-Director, Healthy Materials Lab

When you imagine choosing paint for a space, what do you consider? Color selection is usually the first consideration. At Healthy Materials Lab, our first question is, "What is it made of?" followed by "How and where was it made?" and most importantly, "Who made it and what are they exposed to in the process?" These simple questions lead us to answers that reveal a material's impact on human and ecological health, impacts on the changing climate, and occupational exposure.

All paint is made of four basic components – a binder, pigments, additives, and a solvent. If we examine these components of paint throughout their lifecycle, we see that each impacts people's health, ecologies, climate, and all living things. A quick analysis of the lifecycle of acrylic or "latex" paint, from raw material extraction through manufacture to use and eventual disposal, reveals several concerning impacts.

Acrylic or "latex" paint, the most common form of paint used globally today,[i] begins its life as fossil fuel. Its binder is acrylic resin, which originates as a byproduct of fossil fuel refining. Most paints utilize synthetic pigments derived from petrochemicals, coal tar, or chemical reactions with heavy metals. The most recognizable additives used to make acrylic or latex paint are volatile organic compounds (VOCs). There are many others, such as AlkylPhenol Ethoxylates (APEs), which allow pigments to blend better; antimicrobial chemicals, which are added to inhibit the growth of microbes; or phthalates, added to improve flexibility in paint.

All of these ingredients share the origin of fossil fuels and impact people working in the facility, those living near the factories, and in homes. During manufacturing processes, toxic pollutants are released, polluting air, water, and soil systems, which impact plants, animals, and all living organisms. People whose homes neighbor manufacturing plants are disproportionately impacted. People exposed to additives like APEs, antimicrobials, and phthalates are at risk of hormone disruption.[ii] Workers in factories making paint are chronically exposed to harmful chemicals and, as a result, are prone to liver and kidney disorders, cancer, and damage to DNA.[iii] It is a pressing human rights issue when people are forced to risk exposure to harmfulchemicals in the workplace.[iv]

Further, recent studies show that manufacturing plastics and petrochemicals will be the largest emitters of greenhouse gasses and threaten our ability to meet global climate targets.[v] Another study reveals that plastic paint particles make up more than half of all the microplastics in the world's oceans and waterways.[vi] Hazardous additives in micro-paint particles render them more harmful than other microplastics.[vii] In 2022, for the first time, a study showed microplastic particles are now in human blood and lungs.[viii] Climate change, human and ecological health and human rights are intricately connected.

Thankfully, we have better paint choices that are widely available. There are plenty of paints that are high performing and beautiful and not made of crude oil or petrochemicals. Minerals and plants have been used as ingredients for centuries, and now, thanks to technological advances, their manufacturing is fueled by renewable energy. Mineral-based paints not only avoid VOCs and hazardous additives, but they also have other advantages. An array of mineral-based paints absorb impurities from the air, actively improving indoor air quality. Paints made from minerals refract light, giving spaces a striking luminosity. They are also durable, washable and don't peel or fade over time.

Our choice of healthier, less harmful paints will drive markets toward the creation of healthier spaces and more livable futures for all people.

i Allen, Samantha and Hirt, Meredith. "4 Major Types Of Paint For Your Indoor Project." Forbes, March 14, 2024.
ii "Paint." EWG's Healthy Living: Home Guide, 2024.
iii Ghobakhloo, Safiye, et al. "Exposure to Volatile Organic Compounds in Paint Production Plants: Levels and Potential Human Health Risks." MDPI, 2023.
iv Saironi, Afiqah, et al. "Effect of Paint Exposure Among Paint Workers and DNA Damage: A Scoping Review." Malaysian Journal of Medicine and Health Sciences, 2023.
v Hamilton, Lisa A., et al. "Plastic and Climate: The Hidden Cost of a Plastic Planet." Center for International Environmental Law, 2019.
vi Paruta, et al. "Plastic Paints the Environment." EAEnvironmental Action, 2022.
vii Turner, Andrew. "Paint particles in the marine environment: An overlooked component of microplastics." Water Research, 2021.
viii Leonard, Sophie, et al. "Microplastics in human blood: Polymer types, concentrations and characterisation using μ FTIR." Environmental International, 2024.

Material Overview: Polysilicon & Solar Panels

Sustainable solutions like solar panels are not truly sustainable if they rely on forced labor.

The primary raw material used to produce solar panels is polysilicon, which is found extensively in the vast deserts of the Uyghur Region in China. With 35-45% of the global supply of solar-grade polysilicon coming from the Xinjiang region alone, companies are taking on significant risk of importing goods tainted with forced labor.[i] The Uyghur Forced Labor Prevention Act creates a 'rebuttable presumption' that goods produced in whole or in part in the Xinjiang Uyghur Autonomous Region (XUAR) of China are produced with forced labor and are prohibited from importation in the United States.

As we move ahead to face the challenges created by the climate crisis, ethical decarbonization must be prioritized beyond the perimeter of the job site. Net-zero climate action can be pursued while also working toward forced-labor free supply chains in the built environment.

- Silicon is the most commonly used semiconductor material for solar cells. The rising demand for solar panels has increased silicon's value in the construction industry. In an effort to maintain lower costs in the growing renewables sector, silicon is often produced in countries with higher levels of corruption and poverty, increasing the risk of forced labor at the quarry and during production stages. (Verisk Maplecroft)
- Due to its increased value, local authorities can allow companies to extract silica, the main component of silicon, without first obtaining the required permits or following labor laws. A lack of government oversight further weakens labor protections for local communities, many of whom are already working on or under the poverty line and lack alternative job opportunities. (Verisk Maplecroft)
- Forced labor is reported to be prevalent in the silicon industry, where many workers used for silicon production are employed informally, increasing the risk of debt bondage and making workers vulnerable to further labor abuses.
- Workers in silicon-producing countries are further vulnerable to climate hazards as natural disasters become more frequent and access to resources, such as water, becomes scarcer. Furthermore, an increase in flooding due to extreme rain may cause operational disruptions, such as mine or factory closures – putting informal workers at risk of losing pay. (Verisk Maplecroft)

Components of Solar Panels: Copper, Aluminum, Silver, Steel, Glass

Applications and End Products:

- Solar panels
- Appliances
- Semiconductors
- Heavy machinery

Relevant Certifications

None

i "Traced to Forced Labor: Solar Supply Chains Dependent on Polysilicon from Xinjiang." U.S. Department of Labor, Bureau of International Affairs, 2023.

Top Polysilicon Producing Countries[ii]

1. China 82.9%
2. Germany 6.9%
3. United States 6.1%

Global Polysilicon Market Size (Value in U.S. dollars): $37.31 billion[iii]

Global Polysilicon Exports by Country (based on shipments)[iv]

1. United States 4,207 shipments
2. China 482 shipments
3. Japan 297 shipments

Global Polysilicon Imports by Country (based on shipments)[v]

1. Vietnam 1,294 shipments
2. Japan 1,039 shipments
3. United States 368 shipments

ii "Distribution of polysilicon production worldwide in 2022, by country." Statista, 2024.
iii "Polysilicon Market Size, Share & Trends Analysis Report By Application (Solar PV, Monocrystalline Solar Panel, Multi-crystalline Solar Panel, Electronics), By Region, And Segment Forecasts, 2024 - 2030." Grand View Research, 2023.
iv "Polysilicon Exports from World - Market Size & Demand based on Export Trade Data." Volza, updated July 17, 2024.
v "Polysilicon Imports in World - Market Size & Demand based on Import Trade Data." Volza, June 30, 2024.

Material Expert Analysis

Alan Crawford, Owner and President, Alan Crawford Consulting LLC

Much has been said about solar in recent years, but it is important to revisit silicon in relation not only to solar panels, but also its other uses in the built environment as it is still problematic and inextricably linked to Chinese state-sponsored forced labor in the Xinjiang Uyghur Autonomous Region (XUAR). I commend Design for Freedom for focusing attention on this important issue.

Silicon is the second-most plentiful element in the Earth's crust, behind only oxygen. Elemental silicon is widely used globally including in the built environment. Silicones are widely used throughout the built environment in many applications. Major uses include adhesives, coatings, paint, sealants, and waterproofing. Semiconductors are not obvious in the built environment but every climate control and security system, for example, rely on silicon-based semiconductors and the associated overall electronics package. Silicones are used in assembly of these electronics packages. Fiber optics are increasingly replacing copper wire for data transmission. Silicon-based solar modules are the most visible form of silicon found in buildings and construction.

Accurately tracing the flow of silicon from quartz to finished solar modules is challenging and becoming more difficult due to intentional actions taken by a majority of the global solar industry. Tracing silicon that ends up as silicones, fiber optics, and other globally produced silicon-based products used in the built environment is orders of magnitude more difficult as most of these supply chains are more complex than solar. Recent Chinese laws prohibit any Chinese companies from providing data to enable accurate tracing of any material (silicon, cotton, etc.) produced in the XUAR, due to concerns that the materials have been made with forced labor.

A basic assumption can be made that any silicon-containing products produced in China from metallurgical grade silicon (MGS) have a high risk of containing at least some silicon of XUAR forced-labor origin. There are large volumes of forced-labor-free silicon-based products produced in China and exported around the world, but most of these are impossible to accurately identify due to intentional lack of supplier transparency.

The best current (2024) way to avoid inadvertent use in the built environment of silicon products produced at least in part with XUAR-forced labor is to purchase these materials from fully integrated global producers. These companies start with purchased MGS. This approach does not necessarily eliminate the XUAR-forced labor risk but greatly reduces the likelihood. The supply chains of non-Chinese specialty silicone producers (not fully integrated) should be scrutinized as they could purchase intermediate starting materials from Chinese producers. Assume the cost of these materials will be higher than equivalent products purchased from Chinese or non-basic, non-Chinese producers. However, when the incremental cost is placed in context with the overall project, the difference should be insignificant.

"Accurately tracing the flow of silicon from quartz to finished solar modules is challenging and becoming more difficult due to intentional actions taken by a majority of the global solar industry."

Alan Crawford

Material Overview: PVC (polyvinyl chloride)

PVC production exposes workers to chemicals associated with significant risks to workers' health and climate impacts.

Polyvinyl chloride (PVC) is commonly found in various construction materials such as pipes, flooring, siding, roofing, wall coverings, window frames and treatments, gutters, and carpeting. It is the third-most widely produced plastic globally. In Europe alone, 5.9 million tons are produced annually.[i] PVC's exceptional versatility, distinctive technical characteristics, recyclability, and cost-effectiveness make it suitable for a vast range of applications.

The total global production volume of PVC in 2018 amounted to 44.3 million metric tons. It is forecasted that the global market size of PVC will grow to nearly 60 million metric tons in 2025. The global market for PVC was valued at $68.3 billion in 2021 and is expected to grow at a compound annual growth rate (CAGR) of 3.8% from 2022 to 2031. By the end of 2031,[ii] the global market for PVC is projected to reach $100.9 billion.[iii]

- The PVC production process involves inputs potentially tied to forced labor, health hazards, and environmental risks. (Verisk Maplecroft)
- Some countries manufacturing PVC have documented links to forced labor. Workers trafficked through state programs may not be able to refuse or voluntarily leave jobs assigned to them. (Verisk Maplecroft)
- PVC production exposes workers to chemicals associated with health risks, yet safety standards, such as protective equipment and clothing, may not be maintained in some PVC-producing countries. PVC derives from a chemical named vinyl chloride monomer (VCM), exposure to which can cause increased rates of liver tumors. Additionally, local communities in proximity to plastic production facilities are at higher risk of developing cancer due to airborne toxins. (Verisk Maplecroft)
- The PVC manufacturing process contributes to climate change due to high energy consumption and greenhouse gas emissions. Companies reliant on coal to make PVC emit significantly more pollutants, particularly CO_2, in comparison to those using natural gas. PVC production also utilizes ethane, which is obtained through a natural gas process that emits methane, a significant contributor to climate change. (Verisk Maplecroft)
- The externalized savings and discount for PVC resin made in the Uyghur region is worth a mere $100 per ton.[iv]

Components of PVC: Polyvinyl Chloride (Synthetic Plastic Polymer)

Applications and End Products:
- Flooring
- Decking
- Roofing
- Windows

Relevant Certifications
None

i "PVC in building and construction." European Council of Vinyl Manufacturers (ECVM).
ii "Polyvinyl chloride (PVC) production volume worldwide in 2018 and 2025." Statista, 2024.
iii "Polyvinyl chloride (PVC) market value worldwide in 2021 and 2031." Statista, 2024.
iv Murphy, Laura T., et al. "Built on Repression." Sheffield Hallam University, 2022.

Distribution of demand for polyvinyl chloride (PVC) worldwide in 2021, by end-use sector[v]

1. Construction 61%
2. Flexible packaging 9%
3. Rigid packaging 8%

Global PVC Exports by Country (Value in U.S. dollars)[vi]

1. United States $2.9 billion
2. China $2.3 billion
3. Taiwan $1.6 billion

Global PVC Imports by Country (Value in U.S. dollars)[vii]

1. India $2.3 billion
2. Turkey $1.3 billion
3. Italy $980 million

v "Distribution of demand for polyvinyl chloride (PVC) worldwide in 2021, by end-use sector." Statista, 2024.
vi "Leading exporters of polyvinyl chloride (PVC) polymer worldwide in 2021, by country." Statista, 2024.
vii "Leading importers of polyvinyl chloride (PVC) polymer worldwide in 2021, by country," Statista 2024.

Material Expert Analysis
Jim Valette, President, Material Research L3C

About 10% of the world's polyvinyl chloride (PVC) plastic is manufactured in the Xinjiang Uyghur Autonomous Region (XUAR) governed by China. A 2022 report, *Built on Repression*,[viii] traced the flow of PVC from factories in the province. These companies have been active participants in the XUAR's notorious labor transfer programs. The government has forcibly relocated many thousands of Uyghur people from their home villages to work in the plastics factories.

PVC from Xinjiang has been used to make vinyl floors at a huge factory in Vietnam. A flood of "luxury vinyl" floors from Vietnam entered U.S. home improvement stores and most name-brand flooring distributors in the early 2020s. By early 2023, U.S. Customs and Border Protection halted all imports of flooring suspected of having ties to the Xinjiang region factories. It also placed the factories named in Built on Repression on a list of banned entities.

Xinjiang PVC factories continue to export resins to other countries, especially those of the former Soviet Union. Manufacturers in Russia, Kazakhstan, and elsewhere export flooring, PVC trim, and foam board to the global market. PVC resins have also been known to be exported to a flooring company in India that in turn exports floors to the U.S. and worldwide.

Specifiers of building materials have outsized roles in preventing the use of forced labor. The dominant type of plastic building material is PVC. 70% of all PVC is used in building and construction.

Most open-access building material transparency initiatives extend to Tier I of the supply chain. For complex products such as flooring and casework, PVC factories are found at Tier II or Tier III. Thus, certifiers of flooring and other building materials have not required manufacturers to declare the origins of their plastics. Many flooring products certified by green building transparency initiatives have been found to contain PVC resin from Xinjiang.

Due to the globalized supply chain, the heavy concentration of production in the XUAR, and the lack of import restrictions in other countries, any building material containing PVC plastic of undisclosed origin may contain resins from the forced-labor factories of Xinjiang.

XUAR plastics plants also are among the world's most polluting: they make PVC by reacting coal with chlorine using the toxic metal mercury as a catalyst. This is not the standard practice. Explosions are common. Massive pollution is routine. They are the leading consumers of mercury, and the top sources of mercury pollution. The seven Xinjiang PVC facilities release 50 million tons of greenhouse gases per year, which is about a third of what the entire U.S. plastics industry emits.

Examples of building products sold internationally and known to contain PVC from Xinjiang factories include:

- Vinyl flooring (sheet, tile)
- PVC trim (such as used in door casing)
- PVC foam board
- PVC pipes

The Uyghur Region is one of the very few places on earth where extraordinarily hazardous methods of PVC manufacturing are allowed to persist.

viii Murphy, Laura T., et al. "Built on Repression." Sheffield Hallam University, 2022.

"The world's most toxic industries concentrate in locations where environmental and human rights protections are weakest. The "poison plastic," PVC, follows this pattern."

Jim Valette

Material Overview: Rubber

For more than a century, forced labor has plagued the rubber industry.

Rubber is a versatile material used extensively in construction, including for waterproofing, sealing, and insulation. Approximately 76% of the world's natural rubber is consumed by the tire industry, while the remaining portion supports various construction applications such as joints, gaskets, seals, coatings, and paints.[i] Both natural and synthetic rubbers offer beneficial properties like temperature resistance, flame retardancy, and water resistance. At present, 47% of global rubber consumption is naturally sourced.[ii]

The global supply of natural rubber – around 20 million tons per year[iii] – is produced almost entirely by fragmented smallholders working tiny plots of land[iv] in tropical forests. Millions of these workers tend to plantations in Thailand, Indonesia, China, and West Africa, carefully stripping bark from the trees to extract a milky white sap which is shaped into sheets and dried in the sun. Between them, these farmers provide 85% of the world's natural rubber supply.[v] Natural rubber comes from latex extracted from rubber trees, whereas synthetic rubber is produced from petroleum byproducts. Despite its utility, rubber production particularly in countries like Burma, Cambodia, and Indonesia is marred by ethical issues such as forced and child labor. Natural rubber, although more eco-friendly than its synthetic counterpart, is linked to environmental concerns like deforestation, biodiversity loss, and pollution. Synthetic rubber, derived from crude oil, also poses environmental challenges.

- The European Union relies entirely on imports for its natural rubber, with 85% coming from Indonesia, Thailand, Côte d'Ivoire, and Malaysia.[vi]
- The global construction sector, projected to hit $8 trillion by 2030, is a significant driver of industrial rubber demand, with major consumption in China, the U.S., and India.
- The rubber sector faces issues like volatile global prices, which impact impoverished farmers and Indigenous land rights, and reliance on migrant workers who often face exploitation.
- Despite natural rubber being native to the Amazon basin, approximately 90% of the world's current rubber supply is grown in Asia. Much of this comes from Southeast Asia - specifically Thailand, Indonesia, Vietnam, and Malaysia. These four countries accounted for roughly 70% of the global value.
- Whether synthetic or natural, rubber is intertwined in our day-to-day lives and in the making of our building materials. Synthetic rubber is considered more durable and is made from petroleum by-products.

i "Natural Rubber." European Tyre and Rubber Association.
ii Silva, Daniellla."Huge Potential for Sustainability with Natural Rubber, Experts Say." Forests News, June 30, 2022.
iii "Rubber Industry Overview." Malaysia Rubber Council.
iv "Smallholders Representation Working Group Update - August 2019." Global Platform for Sustainable Natural Rubber.
v Ibid.
vi "The Natural Rubber Supply Chain." European Tyre and Rubber Association, 2022.

The rubber industry was notably affected by the COVID-19 pandemic, with global production decreasing by 5% in 2020 but recovering in the following years. As of 2022, the global synthetic rubber market size was valued at $23 billion and is expected to reach $28.9 billion by 2027.[vii]

- Natural rubber has a variety of applications in the construction industry, including soundproofing, protection of building joints, and wire insulation. Rubber is cultivated in countries with elevated risks of forced labor, child labor, and climate change.
- The rubber sector heavily relies on migrant workers from neighboring countries to farm rubber plantations. Human trafficking is prevalent among these communities and plantation owners can confiscate identity documents and coerce laborers to transfer locations without worker consent. Foreign workers can also incur debts from irreputable recruitment agencies demanding recruitment fees (Verisk Maplecroft).
- Labor laws, particularly those protecting children, can be overlooked by local authorities in rubber plantations. Human trafficking is prevalent among these communities and plantation owners can confiscate identity documents and coerce laborers to transfer locations without worker consent. Foreign workers can also incur debts from irreputable recruitment agencies demanding recruitment fees (Verisk Maplecroft).

Applications and End Products:

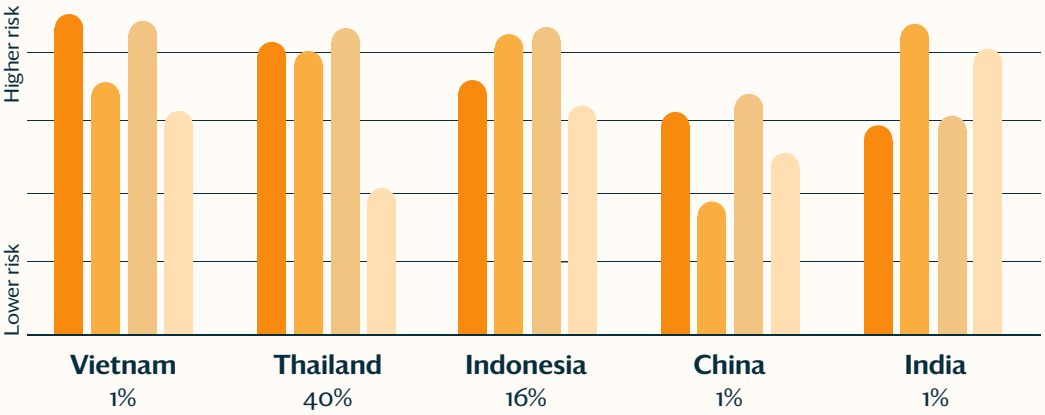
- Rubber flooring tiles
- Tires
- Gaskets and Seals

Relevant Certifications

1. Fairly Traded Natural Rubber
2. FSC Rubber
3. PEFC Certification for Rubber Growers

vii "Synthetic Rubber Market by Type (SBR, BR, SBC, EPDM, IIR, NBR) Application (Tire Automotive (Non-tire), Footwear, Industrial Goods, Consumer Goods, Textiles), and Region, (North America, Europe, APAC, South America, MEA) - Global Forecast to 2027." MarketsandMarkets, 2022.

Natural Rubber Forced Labor and related risks in major countries of origin



Forced Labor
Climate Hazard and Vulnerability
Corruption
Poverty

Percentages at the bottom of this chart represent each country's share of global production.

(Verisk Maplecroft)

Natural and Synthetic Rubber Production Worldwide, 2020 - 2022[viii]

1. 27 million metric tons (2020)
2. 29 million metric tons (2021)
3. 29.6 million metric tons (2022)

Top Synthetic Rubber Production by Country[ix]

1. China 22%
2. European Union 14%
3. United States 13%
4. South Korea 12%

Global Synthetic Rubber Exports by Country (Value in U.S. dollars)[x]

1. South Korea $3.3 billion or 10.6% of global market
2. Thailand $3 billion or 9.8% of global market
3. United States $2.9 billion or 9.6% of global market

Global Synthetic Rubber Imports by Country (Value in U.S. dollars)[xi]

1. China $8.7 billion or 28.2% of global market
2. United States $2 billion or 6.3% of global market
3. India $1.3 billion or 4.3% of global market

Natural Rubber Production by Country[xii]

1. Thailand 4.7 million metric tons
2. Indonesia 2.7 million metric tons
3. Ivory Coast 1.6 million metric tons

Despite natural rubber being native to the Amazon basin, approximately 90% of the world's current rubber supply is grown in Asia. Much of this comes from Southeast Asia – specifically Thailand, Indonesia, Vietnam, and Malaysia. These four countries accounted for roughly 70% of the global value.[xiii]

Global Natural Rubber Exports by Country[xiv] and Distribution of Natural Rubber Exports based on value[xv]

1. Thailand $5 billion or 31.6% of global market
2. Indonesia $2.5 billion or 22% of global market
3. Côte d'Ivoire (Ivory Coast) $2 billion or 11.6% of global market

By value, the top 15 exporters accounted for roughly 94.4% of global natural rubber exports in 2022.

Global Natural Rubber Imports by Country[xvi] and Distribution of Natural Rubber Imports worldwide based on value[xvii]

1. China $4 billion or 21.7% of global market
2. United States $2.4 billion or 12.8% of global market
3. Malaysia $1.6 billion or 8.9% of global market

viii "Production of rubber worldwide from 2000 to 2022." Statista, 2024.
ix "Distribution of synthetic rubber production worldwide in 2020, by country." Statista, 2024.
x "Synthetic Rubber." OEC. world, Observatory of Economic Complexity (OEC).
xi Ibid.
xii "Leading natural rubber producing countries worldwide in 2023." Statista, 2024.
xiii Ibid.
xiv "Leading natural rubber exporting countries worldwide based on export value in 2022." Statista, 2024.
xv "Distribution of natural rubber exports based on value in 2022, by country." Statista, 2024.
xvi "Leading natural rubber importing countries worldwide in 2022, based on value." Statista, 2024.
xvii "Distribution of natural rubber imports worldwide based on value in 2022, by country." Statista, 2024.

Material Expert Analysis

Stefano Savi, Platform Director,
Global Platform for Sustainable Natural Rubber (GPSNR)

Natural rubber is a valuable material in the construction industry. Its elasticity, durability, and resistance to various elements make it a suitable choice for a range of applications such as seals and gaskets, flooring, roofing, vibration isolation, expansion joints, and concrete additives. Its advantages are durability, flexibility, sound insulation, waterproofing, and its potential for sustainability. Unlike synthetic rubber, natural rubber is derived from the rubber tree, a renewable resource reducing dependence on fossil fuels. It generally has a lower carbon footprint than synthetic rubber, and is biodegradable, unless combined with synthetic rubber.

As Design for Freedom reimagines a world where all building materials are produced in equitable ways, the Global Platform for Sustainable Natural Rubber (GPSNR)[xviii] has brought the natural rubber industry together in the pursuit of a similar vision.

In 2023, satellite data-based studies showed that rubber-related deforestation could be three times greater than previously believed, and since the 1990s has impacted an area as large as Switzerland[xix]. At the same time, social risks in the supply chain include the lack of labour laws, land grabbing, poor working conditions, and low wages[xx].

Finding holistic and transformative solutions to these complex problems is not possible for single companies alone. In the last five years, GPSNR has come up with two unique long-term solutions to run in parallel. The first is an assurance model – a step-by-step process for member companies to integrate strong social, economic, and environmental commitments into their operations.

When a company becomes a GPSNR member, they commit to GPSNR's policy framework[xxi] and start reporting on their commitments[xxii] in the first year. In the next year, they start implementing these commitments. The next step is to have an independent assessor review the implementation of their commitments and close any gaps identified. With this verification, natural rubber companies can proceed to make credible claims against an industry-wide system that upholds strong social, economic, and environmental standards.

The model has been approved and piloted in the first half of 2024. Today, GPSNR is fine-tuning the model by integrating learnings from the pilots into the final system. By 2025, all member companies will start following this system of assurance.

The second solution focuses on long-term capacity-building for smallholders and how the costs of this are equitably distributed in the supply chain through a Shared Investment Mechanism.

Through this framework, GPSNR manufacturers' member companies contribute to a pool of funds for capacity-building projects, proportionally to their total rubber consumption. The mechanism makes smallholder capacity-building and resilience a long term GPSNR strategy and all projects running under it are intended towards a large-scale industry-wide shift to support sustainability and equity.

While both these models are industry-specific and unique, GPSNR seeks collaborations with other industries on this path and with similar visions to co-create a truly sustainable world.

xviii "About GPSNR." Global Platform for Sustainable Natural Rubber.
xix "Revealing the true extent of tropical forest loss from rubber plantations." Royal Botanic Garden Edinburgh, 2023.
xx Inkonkoy, F. "Sustainability in the Natural Rubber Supply chain: Getting the Basics right." Zoological Society of London, 2022.
xxi "Revealing the true extent of tropical forest loss from rubber plantations." Royal Botanical Garden of Edinburgh, 2023.
xxii "Sustainability in the Natural Rubber Supply chain: Getting the Basics right." Zoological Society of London, 2022.

"The rubber industry is highly fragmented, with 80% of natural rubber being produced by smallholder farmers with an average surface area of 2 or 3 hectares, bought and sold through many intermediary players."[xxiii]

Stefano Savi

[xxiii] "The Natural Rubber Supply Chain." ETRMA, 2022.

Material Overview: Stone

In countries across Asia and Africa, children work in stone quarries, crushing stone, working at dangerous heights, carrying heavy loads, and using dangerous tools and equipment.[i]

Stone is one of the first materials used in building construction and has been used for centuries.[ii] It is a highly durable, low-carbon, fireproof material. The process of attaining stone involves extraction or quarrying, from natural deposits, to be cut and polished into a finished product. The benefit of stone is that, unlike other popular building materials, it does not require manufacturing in the same way that concrete or steel do, as it is completely natural and extracted from the earth. However, the labor-intensive processes of cutting, sanding, and polishing often involve forced and child labor.

Forced and child labor remains an issue to varying degrees in stone quarries globally, particularly in countries such as China, Brazil, Angola, India, Vietnam, Turkey and Poland, for example.[iii] The ILO reports at least 500,000 workers in India are trapped in debt bondage working in hazardous conditions.[iv] In Nepal, entire families work along riverbanks to collect and break stones that are transported to construction sites. Many children engage in this work, keeping them from school as they perform physically demanding work crushing and carrying stone.[v]

Many factors are at play here, including the rural location of many quarries, the informal nature of the beginning of the supply chain, low-skilled workforce in developing economies, weak legal and regulatory environment, low wages, poverty, absence of social protections, and lack of education. Irresponsible sourcing practices and the pressures of a competitive global market also play a significant part.

- Labor risks for stone tend to occur at the quarry level. The lack of regulation in the industry and the remoteness of quarries often compounds the risk of exploitative working conditions, with bonded labor reportedly a common practice. Stone miners can be vulnerable to exploitation and harassment by quarry owners. (Verisk Maplecroft)
- National and regional governments may be incentivized to overlook the illegal mining of stone, which can result in labor exploitation being similarly overlooked. (Verisk Maplecroft)
- Poverty characterizes much of this industry. Reports of women and children forced to work in quarries are common in higher-risk countries, excavating and crushing stones without protective gear, to earn a living for their families. (Verisk Maplecroft)
- There are significant concerns about the impact of climate change on the production of stone for construction. Poorly built quarries are vulnerable to flooding, where frequent collapse risks the lives of workers. (Verisk Maplecroft)

i "2024 List of Goods Produced by Child Labor or Forced Labor." U.S. Department of Labor, Bureau of International Labor Affairs.
ii "The Impact of Choosing Natural Stones as a Building Material on Sustainability and the Environment." Polycor.
iii "2024 List of Goods Produced by Child Labor or Forced Labor." U.S. Department of Labor, Bureau of International Labor Affairs.
iv Ibid.
v "In-country Research and Data Collection on Forced Labor and Child Labor in the Production of Goods." U.S. Department of Labor, 2020.

Applications and end products:

- Road work
- Interior and exterior design
- Metal manufacturing
- Glass industry
- Slabs
- Blocks
- Countertops
- Tiles
- Kitchen accessories
- Fireproofing purposes
- Foundation for structures
- Cement and concrete aggregate
- Slate roofing

Relevant Certifications

1. ANSI Natural Stone Institute Sustainability Standard
2. Fair Stone
3. XertifiX Standard-Label

Global Stone Production by Country[vi]

Granite, sandstone, and other building stone-producing countries worldwide

1. China 107 million tons
2. Russia 37 million tons
3. India 25 million tons

Global Stone Exports by Country (Value in U.S dollars)[vii]

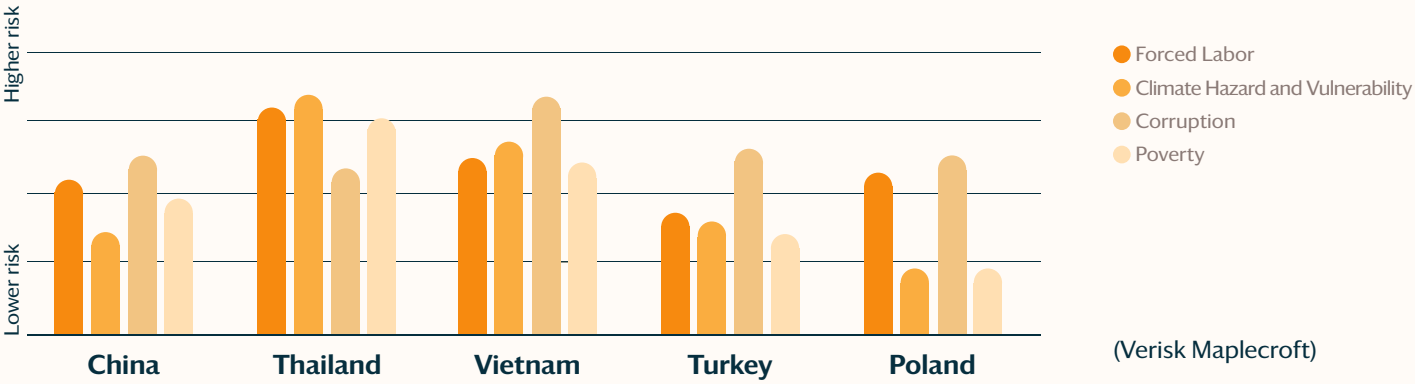
1. Turkey $610 million; 1.7 billion kg
2. European Union $406 million; 359 million kg
3. Egypt, Arab Rep. $280 million; 341 million kg
4. Italy $245 million; 142 million kg

Global Stone Imports by Country (Value in U.S. dollars)[viii]

1. Saudi Arabia $237 million; 704 million kg
2. European Union $131 million; 351 million kg
3. United Arab Emirates $125 million; 339 million kg
4. Qatar $88 million; 104 million kg
5. United States $69 million; 91 million kg

vi "While China Still Dominates Global Granite, Sandstone, and Other Building Stone Market, Russia Emerges as the Fastest Growing Consumer." Global Trade, 2020.
vii "Monumental/building stone, cut/sawn flat/even, ma exports by country in 2021." World Bank, World Integrated Trade Solutions.
viii Ibid.

Natural Stone Forced Labor and related risks in major countries of origin



(Verisk Maplecroft)

Material Expert Analysis
Amar Lal, Child Rights Lawyer, former child labourer in the sandstone sector, lived experience leader and Child Rights Advocate, Delhi, India

Bonded and child labour persist in India's natural stone sector. As a former child labourer rescued at the age of 6, I speak with authority and experience. I know the immeasurable impact on children, their families, and communities. Generations of the same families spend their entire life as labourers from birth until death, always remaining on the outskirts of the society without access to the social protections they need. A great many are migrant workers from within India moving to where low-skilled work can be found. Once they move to other states for work, they are not able to access education for their children, or other government support schemes. In an endeavour to make a living and feed their families, their situation is made worse.

There is much work to be done on this issue domestically, but the international market for natural stone, together with increasing global human rights due diligence legislation, presents an opportunity for the global construction sector to shine a light on these challenges and to work towards the formalisation of the sector, the raising of standards for workers and the elimination of forced and child labour.

Material Expert Analysis
Elaine Mitchel-Hill, International Lead, Design for Freedom

Good news for those designing, building, and trading in natural stone.
Driven by rapid urbanisation, industrialisation and growth in renovation, demand for natural stone in both commercial and residential construction is increasing. By 2032 it is estimated that the natural stone market will be worth US$ 72.95 billion, up by 3.9% from 2023.[ix] Gaining attention for its low embodied carbon, compared to materials like concrete and steel, when sourced locally natural stone can significantly reduce the carbon footprint of a building. Advances in cutting and milling technologies now allow for more complex shapes and structures, which opens new possibilities. Development in methods to use post-tensioning in stone structures, which enhances its strength, has allowed for more daring architectural designs and the versatility of stone being more widely explored in contemporary design. All good news for those designing, building, and trading in natural stone.

Not good news for those in forced labour in quarries.
But not necessarily such good news for those in forced labour in quarries working to pull the material out of the ground, moving the stone and the spoil around, involved in the masonry and processing, or the children labouring on cobble stone production, driving tractors with only three wheels, or riding a jackhammer. You may think this is far-fetched, but I've seen it for myself in the 20 years that I've been going back to raw materials in the natural stone supply chain.

ILO Convention No. 182 - The Worst Forms of Child Labour
It is worth remembering here that the International Labour Organisation estimates that around one million children aged 5-17 are engaged in small-scale mining and quarrying activities worldwide.[x] Under the ILO Convention No. 182 this is defined as among the worst forms of child labour.[xi]

Take a moment here also to consider the untold impact on these children, many of whom will never recover from the physical and psychological trauma of being forced to labour in such conditions.

ix "Global Natural Stone Market Report and Forecast 2024-2032." Expert Market Research, 2024.
x "The burden of gold child labour in small-scale mines and quarries." International Labour Organization, 2005.
xi "ILO worst forms of child labour Convention comes into force." International Labour Organization, 2020.

Concerted and urgent action.

Those actors involved in the procurement and trading of stone, and the wider value chain, must use this increasing demand for natural stone to lead concerted and urgent action to address the serious concerns of forced and child labour in may key sourcing countries. Angola, Brazil, China, India, Turkey, and Vietnam are among those countries where issues of child labour, forced labour; including bonded labour, and the use of detention centre and prison labour persist.

Here the non-payment or withholding of wages, wages which fall below a minimum or basic wage, abusive working conditions, harsh and inhumane treatment, restricted movement, withholding of documentation, and the trafficking of children, are all at play to varying degrees. Health and safety issues persist with a lack or absence of personal protective equipment. Serious dust-related illnesses, such as silicosis, are common as are life-altering or fatal accidents.

Complex Issues

Complex issues, including weak legal frameworks, corruption, lack of social protection, the non-implementation of the rule of law, poverty, lack of education, little to no understanding of worker rights, the informality of large parts of the sector, migrant workforce, increased vulnerability, and cultural social norms which accept child labour, converge with supply chain complexity. Demand for low-cost products from international markets, the impact of the countries' own domestic market, illegal quarrying, and a potential increase in trade with unregulated markets where legal requirements do not present the same human rights due diligence challenges when trading with organisations in legislated territories.

Impacts of Heat Stress

Add to this is the already-present impact of global warming in many sourcing countries and the serious implications of heat stress for those labouring outside in rural areas. The effects of which include reduced productivity, with further negative economic impact, increased accidents, heat-related illnesses and long-term health problems, including cardiovascular and kidney disease, water scarcity both for local populations (and for production – water is crucial for the processing of stone), supply chain disruptions, and economic losses for businesses in the supply chain.

Addressing the wide range of human rights issues.

This increasing and perhaps renewed interest in natural stone must now be made to count in addressing the wide range of human rights issues in a sector where they are often hidden from view, progress has been painfully slow, and yet where governments regulate the licensing of extraction at quarry level and earn significant revenues through taxes, royalties and fees; and while specific figures aren't readily available, natural stone contributes significantly to the economy of each.

> "Whilst companies cannot be criticised for having deeply engrained forced labour in supply chains where state enforcement is weak, they can and will be criticised for failing to take measures to eradicate forced labour where they clearly have the power to do so."
>
> Geeta Koska, Barrister Krishnendu Mukherjee, Barrister and Indian Advocate, Doughty Street Chambers

Material Overview: Textiles

Interiors, which include an array of uses for textiles, provide a gateway and opportunities for industry leaders and consumers to ethically source materials such as upholstery, carpet, and window coverings.

Textiles are defined as materials used in various construction applications, including natural fiber insulation, wall coverings, carpet, furniture, and upholstery. In construction, building insulation is one of the biggest uses of textiles in the industry.

Textiles and interiors provide an entry point to Design for Freedom. The apparel industry also offers us a field guide on transparency and consumer demand.

- Recent shifts in consumer preferences have created a demand for increased visibility in the textile industry. This has led to significant levels of transparency and a number of ethical and sustainable textile certifications.
- Cotton's supply chain carries high risks of forced labor and human rights abuses across all stages, from picking to product manufacturing and recycling.
- The textile industry also contributes to environmental degradation, with 85% of all textiles purchased in the United States ending up in landfills at the end of their use.[i]
- In Turkmenistan, one of the world's largest cotton producers, state-imposed forced labor exploits tens of thousands of farmers and public-sector workers.[ii]
- In Xinjiang, China, where 90% of China's cotton[iii] and 20% of the world's cotton is produced, the government forces Uyghur and other ethnic minorities into labor as part of widespread human rights abuses.
- With new regulations and tools available, the construction industry is positioned to transform its textile and material sourcing to meet sustainability and ethical standards.
- Cotton is the most-produced plant-based fiber, with jute being a close second.[iv] It is used to make ropes, agricultural erosion prevention, upholstery, carpet, rugs, linoleum backing, and curtains.

The interiors of our homes and offices are designed with textiles. Furniture, upholstery, carpet, and window coverings are examples of products where textiles are used. The construction industry consumes approximately one quarter of the global textile market and textiles that are at high risk of forced labor. According to UNICEF, many of the 160 million child laborers work within the fashion supply chain, making textiles and clothing for markets worldwide.

i "Your Clothes Can Have an Afterlife." National Institute of Standards and Technology, 2022.
ii "State-imposed forced labour in Turkmenistan: Now is the time for action." Anti-Slavery International, 2023.
iii Sudworth, John. "China's Tainted Cotton." BBC.
iv "What is Jute Fabric: Properties, How it's Made and Where." Sewport.

Due to widely reported human rights violations, the high-risk garment industry made some progress towards addressing exploitation within their supply chain.

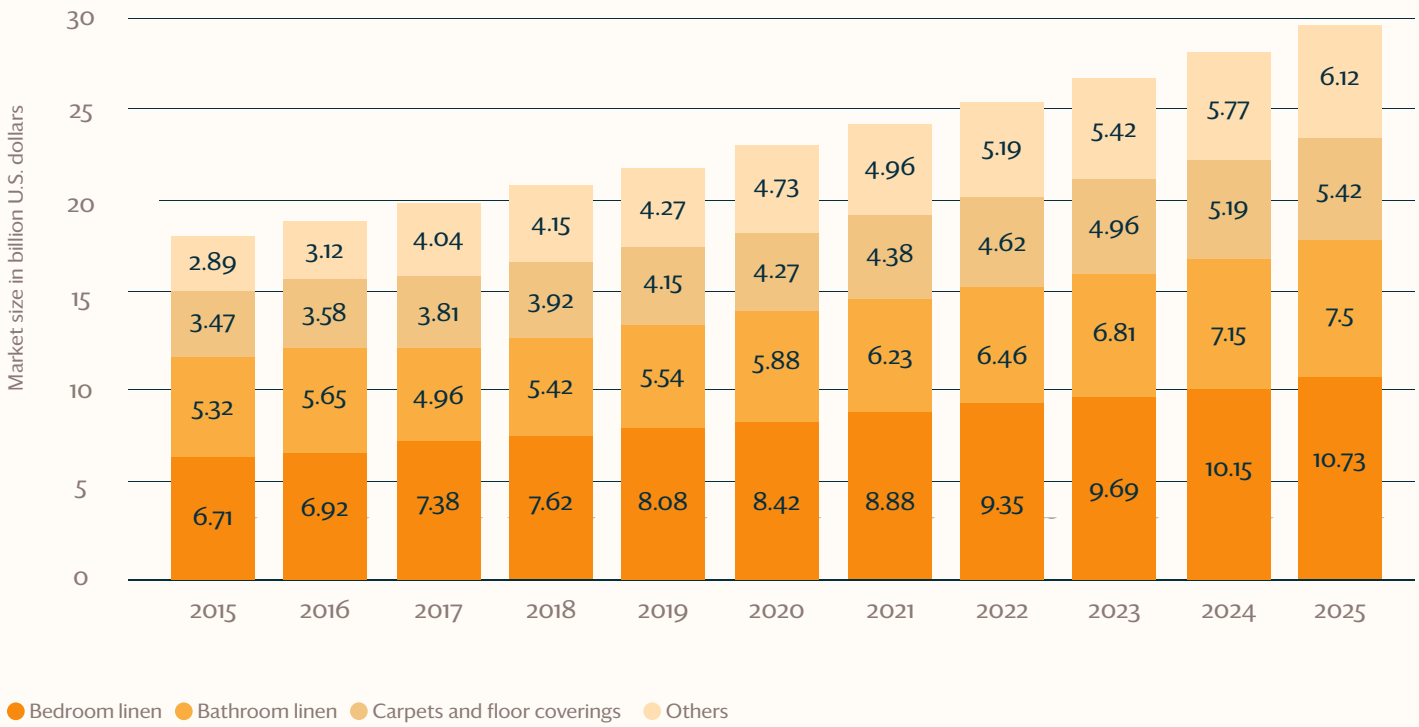
- Reports of state-mandated labor and forced labor are widespread in the textiles and fibers industry, particularly at the farm level. Temporary farm laborers can be prevented from leaving the farms as their identity documents are confiscated by farm owners or recruiters. Living conditions may also be poor, with little to no access to clean drinking water or a central sewage system, and many workers are living on or below the national poverty lines. (Verisk Maplecroft)
- Tight profit margins and turnaround times mean the processing of textiles, through spinning, weaving or dyeing, is often sub-contracted to informal or home-based workers, including women and children. These workers are vulnerable to exploitation, including long working hours and sexual abuse, as they often lack formal contracts and few labor protections. (Verisk Maplecroft)
- Despite strong labor regulation in many countries where textiles are produced, poor enforcement of labor laws can weaken protections available to these workers, enabling conditions that are conducive to modern slavery. (Verisk Maplecroft)

Value of the home textiles market worldwide from 2018 to 2025 (Value in U.S. dollars)[v]

1. $121 billion
2. $133.4 billion (2025 estimated value)

v "Value of the home textiles market worldwide from 2018 to 2025." Statista, 2024.
vi "Home textiles market size in the United States from 2015 to 2025, by product category." Statista, 2024.

Home Textile U.S. Market by Product Category



Home textiles market size in the United States from 2015 to 2025, by product category (Value in U.S. dollars)[vi]

Applications and End Products:

- Indoor/outdoor surfacing
- Roofing material
- Thermal insultation
- Building façades
- Interior design products
- Furniture
- Acoustical panels
- Fabric-wrapped wall panels and partitions
- Textile reinforced concrete
- Fiber grids
- Fiberglass
- PTFE-coated fiberglass membrane
- Vinyl-coated polyester
- Film
- Shade cloth

Commercial Textiles

Building insulation is one of the biggest uses of textiles in construction such as the use of fiberglass due to versatility and durability. Typically, fiberglass is blended with other materials for strength.[vii] In addition, advancements in textile uses "offer new forms for use in infrastructure projects and in building design and construction."[viii]

Global Glass Fiber Market

Glass fiber market size worldwide in 2016 and 2021, with a forecast for 2027 (Value in U.S. dollars)[ix]

1. $12.6 billion
2. $17.5 billion (2027 estimate)

Relevant Certifications

1. Better Cotton
2. Fairtrade
3. FSC Certified Viscose
4. Global Organize Textile Standard
5. Good Weave
6. Oeko-Tex
7. Responsible Wool Standard

vii "6 Fiberglass Uses In Construction." ArchEyes, 2022.
viii "Sustainable infrastructure and construction textiles." Fabric Architecture, ATA Publication, 2019.
ix "Glass fiber market size worldwide in 2016 and 2021, with a forecast for 2027." Statista, 2024.

Material Expert Analysis

Vicky O'Brien, Private Sector Officer, Anti-Slavery International

Risks associated with key raw materials in building and construction

From natural fibre insulation to wall furnishings and upholstery, cotton is versatile and is increasingly being relied upon by architects and designers for sustainable building. However, there are high risks of labour exploitation and egregious human rights abuses at every stage of cotton's value chain, from picking and processing to product manufacturing and recycling. With new laws being introduced in the EU, and explored in other countries, companies must wise up to the risks of forced labour and act in order to reduce their exposure.

Risks of state-imposed forced labour in cotton

An immediate priority is for buyers to understand the sheer volume of cotton produced as a result of state-imposed forced labour. This is when a government forces its citizens to work, for example, as a method to mobilise labour for economic development, to punish political dissents, or to discriminate against religious and ethnic minorities. In these contexts, company disengagement and disinvestment are the only effective response, as companies lack the leverage to improve conditions on the ground.

For example, in Turkmenistan (one of the world's largest cotton producers and exporters), the government maintains complete control over the cotton production system, coercing and exploiting tens of thousands of tenant farmers, public sector employees, and others to produce and harvest cotton. Independent monitoring in Turkmenistan shows that state-imposed forced labour remains widespread and systematic,[x] and the government severely represses all civic freedoms and fundamental labour rights. This means those who are publicly critical must work in exile, and independent labour monitors report at great personal risk.

Meanwhile, in the Xinjiang Uyghur Autonomous Region of China (another global hub of cotton growing and processing; accounting for up to 90% of China's cotton and around one-fifth of the world's cotton production)[xi], the government of China is perpetrating mass human rights abuses against Uyghur and other Turkic and Muslim-majority peoples. These abuses include mass surveillance, arbitrary detention, rape, torture, forced sterilisations, and state-imposed forced labour[xii], including in the harvesting and processing of cotton.[xiii]

x "Leading the Fight Against State-Imposed Forced Labor in the Cotton Fields of Turkmenistan." Cotton Campaign.
xi Sudworth, John. "China's Tainted Cotton" BBC.
xii "Guardians & offenders: Examining state-imposed forced labour." Walk Free, Global Slavery Index Spotlight.
xiii "Businesses should be forced to cut ties with China's modern gulag." Anti-Slavery International, 2020.

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What can be done about this?

The building industry must act swiftly to ensure its supply chains are free from exploitation. This is not just to avoid complicity in these egregious human rights abuses, but also to meet new obligations under a quickly evolving regulatory landscape (such as the EU's Corporate Sustainability Due Diligence Directive and the Forced Labour Regulation). Fortunately, step-by-step guidance on how to conduct such due diligence is readily available; be it region-[xiv] or material-specific.[xv] These new laws are creating an imperative for businesses to map their product and supply chains, which is becoming easier with digital tools such as Supply Trace.[xvi]

Progress is possible; now, more than ever, the building industry has the impetus, the tools, and economic leverage to challenge its own purchasing and businesses practices.

"With new laws being introduced in the EU, and explored in other countries, companies must wise up to the risks of forced labour and act to reduce their exposure."

Eloise Savill

xiv "Leading the Fight Against State-Imposed Forced Labor in the Cotton Fields of Turkmenistan." Cotton Campaign.
xv Cranston, Chloe, et al. "Respecting Rights in Renewable Energy, Investor guidance to mitigate Uyghur forced labour risks in the renewable energy sector." Anti-Slavery International, 2024.
xvi "Open supply chain intelligence for a just world." Supply Trace, Northeastern and Sheffield Hallam Universities collaboration.

Material Overview: Timber

Globally, up to 50% of illegally logged timber is estimated to be dependent on forced labor.[i]

Illegal logging often takes place in remote locations around the world in countries with little or no regulations and where corruption is common.

Timber is the most-utilized biobased material in the built environment and one of the most widely used construction materials in the world. Given that an estimated 38% of wood products globally are being used for buildings and construction[ii], an examination of timber's provenance and the embedded labor within the chain of custody of the material is the responsibility of all decision-makers on design, construction, and manufacturing teams worldwide. Between 15% and 30% of globally traded timber is illegally logged without oversight, and for tropical timber that rate is as high as 90%.[iii]

Responsible forest management, which includes fair labor practices for workers, is the best pathway forward to meet the staggering demand of wood by the construction industry. By clearing old-growth trees to help new trees grow and maintain balance for forest fire prevention, ethical forest management fosters a regenerative forest ecosystem without depleting natural resources and strengthens neighboring economies by providing fair and decent work for community members.

- Forced labor is common in the timber industry in some major producers, primarily occurring in logging and sawmills. Violence, threats, non-payment of wages and the confiscation of documents are all reported in the logging industry. Those working in sawmills can also often face excessive and unpaid overtime, and may be forced to work in precarious conditions without protective equipment. (Verisk Maplecroft)
- Poverty in many timber-producing countries is a key risk factor driving communities to migrate for work in the forestry sector. Many are compelled to work without contracts to pay off recruitment fee debts. Indigenous communities are also being forced off their traditional lands and can be compelled to deforest them. (Verisk Maplecroft)
- Government officials and law enforcement officers can capitalize on the global reliance on timber for construction by turning a blind eye to illegal logging in return for illicit payments from logging companies. The informality of the sector combined, with the isolation of logging areas, makes labor inspections and unionization challenging. (Verisk Maplecroft)
- Rising temperatures and extreme weather events make working conditions for those in timber-producing countries difficult. Deteriorating agricultural yields, due to increased droughts and weak soil biodiversity, are also pushing farmers out of work and into logging. (Verisk Maplecroft)

i "INVESTOR SNAPSHOT Forced Labor in Forestry (incl. Paper & Forest Products)." KnowTheChain, 2019.
ii Ramage, Michael, et al. "The wood from the trees: The use of timber in construction." Renewable and Sustainable Energy Reviews, Volume 68, Part 1. February 2017.
iii "GLOBAL FORESTRY ENFORCEMENT Strengthening Law Enforcement Cooperation Against Forestry Crime." Interpol, April 2019.

Applications and End Products

Sawn timber
- Architectural roof trusses, cladding, decking, fencing, flooring, framing, pergolas
- Rails, balustrades, interior/exterior
- Stairs

Wood veneer
- Furniture applications and decoration
- Interior doors
- Flooring decoration

Plywood
- Laminated wood
- Furniture
- External wall construction

Laminate wood
- Flooring
- Furniture
- CLT (Cross-Laminated Timber)
- Doors
- Cabinetry

Relevant Certifications

1. American Tree Farm System
2. Forest Stewardship Council Certification
3. Programme for the Endorsement of Forest Certification
4. Sustainable Forest Initiative

Timber Consumption and Production

Percentage of Global Consumption
Forest Product Consumption and Production[iv]

Industrial roundwood
1. United States 18%
2. China 12%
3. Russian Federation 9%
4. Brazil 7%
5. Canada 6%

Sawn wood
1. China 25%
2. United States 22%
3. Germany 5%
4. Canada 3%
5. Japan 3%

iv "Forest product consumption and production." FAO Forestry Stats, 2020.

Wood-based panels

1. China 41%
2. United States 13%
3. India 3%
4. Germany 3%
5. Russian Federation 3%

Percentage of Global Production Forest Product Consumption and Production[v]

Industrial roundwood

1. United States 19%
2. Russian Federation 10%
3. China 9%
4. Brazil 7%
5. Canada 7%

Sawn wood

1. China 18%
2. United States 17%
3. Russian Federation 9%
4. Canada 8%
5. Germany 6%

Wood-based panels

1. China 44%
2. United States 9%
3. Russian Federation 4%
4. Germany 3%
5. India 3%

Industrial Roundwood, Coniferous and Non-coniferous Production[vi]

Top Coniferous Industrial Roundwood Production

1. United States 293 million metric tons or 26% of the global production
2. Russian Federation 161 million metric tons or 14% of global production
3. Canada 108 million metric tons or 9% of global production

Top Non-Coniferous Industrial Roundwood Production

1. China 152 million metric tons or 18% of the global production
2. Brazil 101 million metric tons or 12% of global production
3. Indonesia 83 million metric tons or 10% of global production

Global Export Quantity of Industrial Roundwood[vii]

1. New Zealand 21.4 million metric tons
2. Czech Republic 11.2 million metric tons
3. Germany 11.1 million metric tons

Global Import Quantity of Industrial Roundwood[viii]

1. China 53.4 million metric tons
2. Austria 9.7 million metric tons
3. Sweden 6.4 million metric tons

v Ibid.
vi "World Food and Agriculture, Statistical Yearbook 2022." Food and Agricultural Organization of the United Nations.
vii "Forestry Production and Trade." FAOSTAT, Food and Agricultural Organization of the United Nations.
viii Ibid.

Top Sawn Wood, Coniferous and Non-coniferous Production[ix]

1. United States 81.2 million metric tons
2. China 79.5 million metric tons
3. Russian Federation 39.9 million metric tons

Global Sawn Wood Export Quantity[x]

1. Russian Federation 27.2 million metric tons
2. Canada 25.9 million metric tons
3. Sweden 13.2 million metric tons

Global Sawn Wood Import Quantity[xi]

1. China 27.7 million metric tons
2. United States 27.3 million metric tons
3. United Kingdom 7.1 million metric tons

Top Wood-based Panels Production[xii]

1. China 153.3 million metric tons
2. United States 33.5 million metric tons
3. Russian Federation 17.1 million metric tons

Export Quantity by Country[xiii]

1. China, 14 million metric tons
2. Canada 8 million metric tons
3. Russian Federation 6.3 million metric tons

Import Quantity by Country[xiv]

1. United States 17.8 million metric tons
2. Germany 6 million metric tons
3. Japan 3.7 million metric tons

ix Ibid.
x Ibid.
xi Ibid.
xii Ibid.
xiii Ibid.
xiv Ibid.

Rosewood in Madagascar

Ethical Decarbonization in Timber Selection Utilizing Stage Risk Assessment Platform

Chris Sharples, AIA, Founding Principal, SHoP Architects

Like many materials utilized in the building supply chain, timber faces similar challenges when it comes to ethical sourcing. Understanding species classification and its material characteristics such as fiber composition and region make timber sourcing and manufacturing a highly complex process. Information regarding manufacturers' sourcing and labor practices depends largely on the degree to which architects, engineers, and builders as specifiers have access to and the transparency of global supplier data.

To truly understand the possibility of embedded risk of forced labor in the timber supply chain requires a deeper understanding of the chain of custody that permeates the wood industry. Timber certification standards like the FSC, Forest Stewardship Council, CSA, Canadian Standards Association and SFI, Sustainable Forestry Initiative, provide some degree of confidence that the timber is being ethically sourced. Most productive forests in Canada, for example, are Crown Land, owned, regulated, and leased by the federal and provincial government, whereas most productive U.S. forests are privately owned and run with a high degree of ethical standards. This is often not the case with timber forested in other parts of the world, specifically Africa, Latin America and Southeast Asia.

For architects, knowing with a measure of certainty that any material, including mass timber, under consideration early in the concept phase of a design process is ethically sourced would be the ideal scenario, however getting this information prior to procurement can be challenging. Suppliers and fabricators are formally introduced during the later stages of the design process as the project is documented and specifications are produced for the potential bidders. Design build or early procurement packages allow for engagement earlier on with suppliers, but this process is not typically the norm in North America. It is important to note that by its nature of being a highly manufacturable material, mass timber can potentially accelerate procurement processes leading to a more in-depth study of timber fabricators and suppliers in the earlier stages of design.

To address this challenge, Fair Supply Analytics, a web-based ethical sourcing platform, has developed an early phase risk assessment protocol called "Spotlight" to complement and confirm later-stage risk analysis. This program allows designers and contractors to investigate supplier risk before the procurement phase process. If a potential risk is present, a questionnaire can be automatically produced and shared with the supplier fabricator to assess the individual supplier risk and how the risk may be mitigated. In addition to analyzing ethical sourcing, this search tool measures embodied carbon and biodiversity indicators captured in an overall risk score.

The inputs are as follows: an architect, engineer, builder and owner can upload supplier/fabricator data-such as material, industry, region, and projected cost–and through integrated supply chain modeling built upon third party ethical source data from national databases, NGOs, and global trade and economic data, Fair Supply is able to produce a risk index for materials and products being specified or procured for a particular project or business.

Kimberly Randle, the founder and CEO of Fair Supply, describes Spotlight as a kind of "ethical sourcing Google search." Spotlight will become a key addition to help support Fair Supply's goal of assisting businesses in accessing and managing risks of forced labor, carbon emissions, and biodiversity impacts within their company's supply chain. Through its proprietary integrated assessment engine, Fair Supply maps entire supply chains, providing insights on potential risks, helping companies comply with global regulations, and aligning their operations with a company's sustainability goals. The tool also helps companies monitor their progress over time and ensure responsible sourcing across global supply chains.

By analyzing procurement data, Fair Supply's Spotlight program enables businesses to monitor ESG risks up to ten tiers deep in their supply chain. The materials supply chain can be increasingly opaque and challenging to get a clear appreciation of the inherent risks. Like many risk management tools, analyzing ethical sourcing often requires multiple feedback loops and direct engagement with suppliers through questionnaires to expose possible risk and explore ways to mitigate it. Spotlight prioritizes supplier engagement and helps the AEC team in determining which suppliers and fabricators may need to take action to address ethical risks in their supply chain. In the end, the goal is to develop collaborative relationships through transparency to both increase ethical sourcing in the material supply chain and build trust leading to a more humane and resilient supply chain.

The 21st Serpentine Pavilion was the first international Design for Freedom Pilot Project.

Material Expert Analysis

Mark Heath, MME Group, Ex-Deputy Director,
Gangmasters Labour Abuse Authority

A recent programme of work to assess the risk of labour exploitation within the European timber supply chain, focussing primarily on Scandinavian states and, to a lesser degree, Baltic states, identified an issue which increased that risk.

Three factors immediately stood out from conversations with key stakeholders, including with labour user businesses working directly within timber production and regulators working within those countries.

Firstly, all actors believed that sufficient legislation was in place in the area of worker protection. Many stated that Scandinavian countries were leaders in this space and that businesses were fully aware of their responsibilities, with high levels of compliance.

Secondly, industry accreditations, such as PEFC and FSC, were seen as an additional protection. Although, it was recognised that until recently the focus was on the sustainability and sourcing of the product with little in relation to the welfare of the workforce.

Thirdly, the use of labour agencies/brokers within the sector was thought to be minimal, mainly used for providing workers with specialist skills rather than for general/manual labour, which is required for a number of roles to include planting. In relation to his, however, labour provision under the Posted Worker's Directive (PWD) was highlighted as an area of concern.

PWD applies within member states of the European Union (EU) and was introduced by EU Directive 96/71/EC. A posted worker is an employee who is sent to a Member State of the European Union to perform a service for a limited time, without fully integrating into the host country labour market.

The European Labour Authority website states that approximately 3.6 million postings involving around 2.6 million workers are estimated in the EU, with 1.2 million workers are active in two or more Member States.

PWD presents challenges in relation to ascertaining the exact nature of employment arrangements and also to the enforcement of the relevant employment legislation. Issues compounded by work being undertaken in remote locations with limited access and communication.

Common issues in relation to worker exploitation prevail, such as remote working, language barriers, lack of information for worker rights, and limited access to remedy. For those seeking to identify and tackle exploitation, it can be difficult to determine the recruitment methods used ahead of workers being posted to another EU country.

Additionally, complex company structures have been seen, with companies being interlinked across a number of countries, making it difficult to ascertain which countries' legislation should be applied. Much is being done to facilitate closer co-operation but it would not be safe to assume that cross-border collaborations and legislative gateways for the sharing of relevant data are in place for all member states.

However, the difficulties presented to the sector, accreditation bodies and regulators with regard to understanding the risk of exploitation offer an opportunity. Efforts should be made to develop links between these parties to gain an enhanced understanding of risk, the recruitment methods and migration routes along with common areas for action. Without such efforts, the challenge will remain.

Generational Sustainability, a Model of Japanese Timber

Toshihiro Oki, RA, Architect Advisor, Grace Farms Foundation

In traditional Japanese architecture, the 'process' or 'way' of building is just as important as the final built form. The care and attention people put into the fabrication process imbues the architecture with something more, as one can sense the hand that worked the material into its natural essence. Their skills and spirit are felt by those who experience them. Its humanness is celebrated, and the structures are deeply cared for. This 'value' is intuitively understood.

Near the ancient capitals of Japan (Nara and Kyoto) lies a mountainous forest region called Yoshino, where favorable soil and climate conditions foster the growth of Sugi (cedar) and Hinoki (cypress) trees. Valued for their straight grain and rot/insect-resistance, these trees were used for various applications such as furniture, sake barrels, construction, and temple buildings. Commercial forestry practices started here about 500 years ago, where saplings were planted densely and then selectively thinned out over a period of 100-200 years, then replanted again in cycles. This creates closely spaced annual growth rings within the trunk that ensure a high-quality wood, but it also requires many generations of foresters to carefully tend to the forest. Each has to think ahead and plan for results that come to fruition generations in the future. Their actions are felt by people who they will never meet as these trees will long outlive them. It is a system of generational sustainability where each generation gifts the next one.

The 'value' of these forested logs is then gifted to the next cycle of people, who are the carpenters and wood workers. Once the wood is air-dried, it is selected and shaped into its next reiteration of construction and carpentry. Traditional Japanese architecture uses wood joinery to construct a structure that can move with the fluctuating humidity in Japan and the ever-present earthquakes.

Metal nails and fasteners expand and move at different rates than wood (and also rust), so they can cause rot and damage to the wood, making it difficult to repair. With proper technique and knowledge, all-wood structures can last more than 1,000 years. Rotted sections can be skillfully cut out and replaced with proper wood joinery. The world's oldest wood structure in use today is the Horyu-ji temple complex, standing in Nara for more than 1,300 years.

And the key to this is the master carpenters (miyadaiku), who hone their craft over a lifetime. Historically, the best wood was used in the temples, 'where the gods and buddhas dwell', so they put their utmost care and heart into building them. Anyone entering such architecture can sense that, so these carpenters and structures became highly valued. Even today, some miyadaiku organizations still exist from 1,400 years ago. One of them, Kongo-Gumi, is the world's oldest documented company still running today – a testament to its longevity.

Looking at the 'systems' ecology of how these trees are grown, cared for, logged, constructed, and maintained by many cycles of people, one can trace this lineage of valued relationships that are passed on from generation to generation. It is a circular type of economy, where its value is understood and carried forward. It has a self-sustaining momentum that people are willing to promote in a more natural and holistic way. This is different from the efficiency-based world economy, where a more linear model is followed: extraction, fabrication, transaction, one-time use and final demolition/waste - often in the shortest life span possible. Under this model, market efficiency is followed where low-cost and speed are the common denominators. The lowest-cost human labor is sought after, as its value is in its 'low cost'. Ultimately, if people become commodities, society will lose value and start to break down – with a big cost to pay later on.

But we don't have to go down that path. Perhaps looking back into history can be a good way to remember how to move forward. The actions we take today could be a gift for the future generations who we won't be able to meet. The thought of that may be enough for most of us to ensure its success.

"Perhaps looking back into history can be a good way to remember how to move forward. The actions we take today could be a gift for the future generations who we won't be able to meet."

Toshihiro Oki

Japan's Yoshino Forest is a model of generational sustainability.

© Yoshihiro Inada

Section 3 Toolkit

We all have agency to Design for Freedom

The Toolkit

Design for Freedom by Grace Farms was launched in 2020 with the release of the historically significant Design for Freedom Report to create a radical paradigm shift to remove forced and child labor from the building materials supply chain. In 2022, the Design for Freedom Toolkit was published to provide tools and research that practitioners can use to integrate ethical and sustainable sourcing strategies into their practices.

This Design for Freedom International Guidance & Toolkit builds on this work. The Tools that follow can advance our collective work to design and build a more humane future together.

Call to Action
Stakeholder Guidance

Protecting human rights in the building materials supply chain is now an imperative.

The lack of scrutiny experienced so far by the construction sector is gradually being lifted. The effect of global legislation, reporting requirements, growing interest from the investment community, and the elevation of strategic dialogue at multiple levels are all compounding and sending a crystal-clear signal to all in the built environment ecosystem; we must all use our agency to do better, and do it faster.

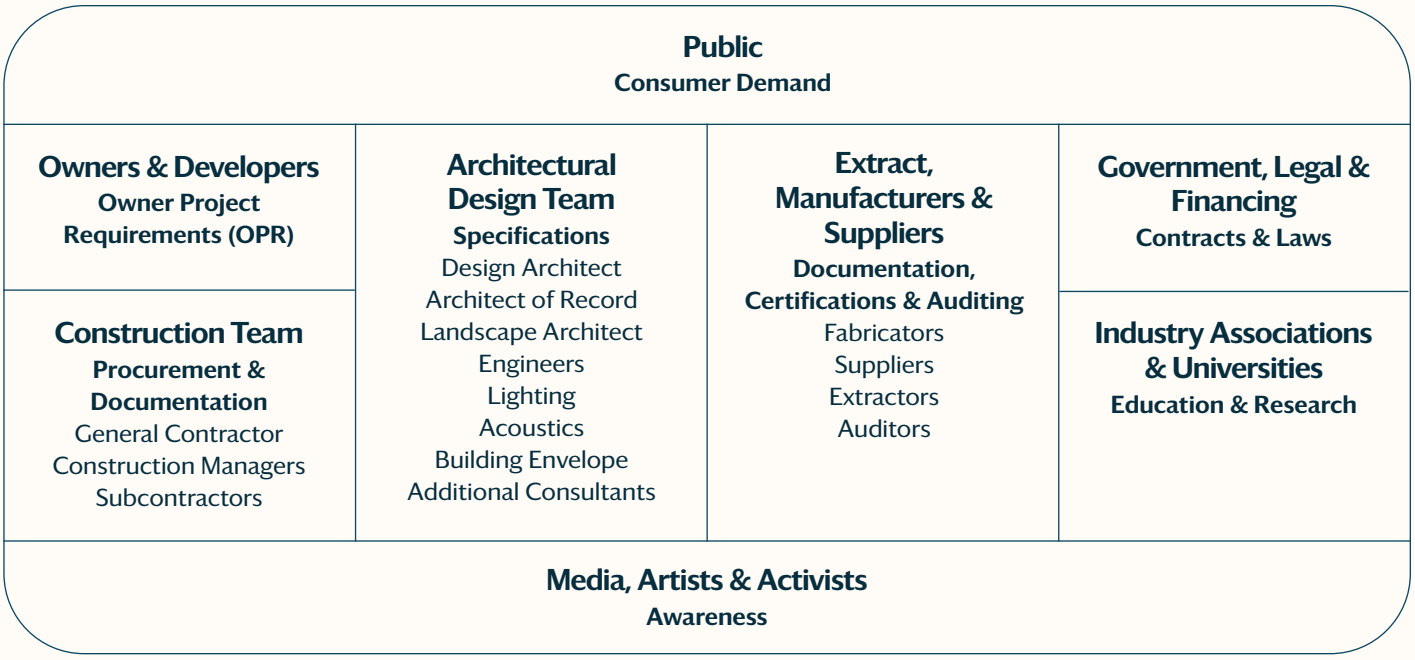
Ecosystem of the Built Environment

Means and methods to ethically influence the building materials supply chain

The Design for Freedom Guidance & Toolkit seeks to empower you by outlining practical actions. Effective and lasting change requires that we each take meaningful steps to help end the suffering of our fellow human beings; the children, women, and men forced to work in supply chains often with unimaginable and life-long impacts from which many will never fully recover. This Guidance & Toolkit clearly communicates the issues. We must each now choose whether we will continue to be part of the problem or part of the solution.

We recognize that communicating about forced and child labor in the building materials supply chain can be difficult. It is important to understand cultural context when engaging in dialogue and meet each stakeholder where they are to harness their own agency.

The importance of semantics here can not be overstated. The use of acceptable language will aid in finding common ground with the wide range of stakeholder involved. For example, in some countries forced labor may be expressed as informal labor.



Design for Freedom Principles

- **Find and Address Forced Labor**
  Know your risks back to raw materials, work in collaboration to address forced labor, and promote transparency and the decent work agenda.
- **Pursue Ethical Decarbonization**
  Analyze decarbonization plans and product development through a human rights lens.
- **Prioritize Circularity**
  Standardize and document the use of salvaged, upcycled, reclaimed, and innovative products, and challenge existing business models.

Your Responsibility to Design for Freedom

Owners & Developers

Build Capacity to Protect Capital

- Add ethical sourcing materials requirement to the OPR
- Add a contract clause to establish:
  - Expectation to examine project supply chain
  - Right to review efforts to be made
  - Require consistent reporting on project implementation
- Know your supply chain
- Invest in a supplier audit of high-risk materials

Architectural & Design Teams

Use design thinking to revolutionize project delivery

- Establish requirements for responsible materials in the specification process
- Prefer raw and composite materials that are certified
- Pursue Ethical Decarbonization by seeking visibility into supply chains through material transparency
- Prioritize Circularity by standardizing the use of salvaged, upcycled, reclaimed, and innovative products throughout design
- Reassess what is in your Materials Library
- Use Design for Freedom Ethical Design Requirements Specs and Closed Specs for examined materials
- Ensure your contract includes a substantial completion relief clause and includes expectations and the right to review
- Send the Design for Freedom Self-Assessment Questionnaire to your suppliers
- Educate your team on Design for Freedom Principles
- Participate in the AIA Materials Pledge and abide by the AIA Code of Ethics

Construction Teams - Procurement & Documentation

Deliver responsible projects on time

- Establish the requirement for human rights due diligence in the procurement process
- Understand how sanctioned materials can extend project delivery and mitigate this risk onsite
- Ask suppliers to provide Supplier Codes of Conduct and Certifications for all tiers in their supply chain
- Demand attention to labor issues among certification initiatives of suppliers/products
- Audit your supply chain with third-party providers
- Educate project team on critical issues related to forced and child labor

Manufacturers & Suppliers

Understand and address reputational risk

- Address forced and child labor for all supply chain tiers in a Supplier Code of Conduct
- Require end-to-end third-party auditing of labor in the building materials supply chain
- Develop a Corrective Action Plan for remediation of harms associated with suppliers
- Pursue Ethical Decarbonization and Prioritize Circularity within your product supply chains

Academic Research - Innovation

Educate future generations to prioritize responsible consumption

- Add forced labor criteria into all modeling, materials examination, and projects
- Promote research of policy, material science, and supply chain due diligence technology
- Advocate for universities to ethically source for new and existing facilities

Government

Work together to enforce legislation

- Create a level commercial playing field domestically and internationally
- Align with civil society organizations
- Establish, maintain, and enforce a strong regulatory environment
- Lead by example by ensuring that public funding is used for ethically sourced materials

Legal & Investors

Create accountability for exploitation and incentives for compliance

- Encourage and accelerate human rights due diligence to safeguard clients from risk
- Ensure clear contractual obligations
- Demand decision-critical human rights data and evidence
- Evaluate financial risk through a human rights lens

Industry Associations

Hold the profession to a higher standard

- Provide forums for education and dialogue on the issue of forced labor
- Educate members on risk and professional liability
- Modify professional standards of practice to require responsible sourcing

Media, Artists, Activists
Amplify the message
- Give a voice to survivors of forced and child labor
- Illuminate injustices and inspire a hopeful future through public artwork
- Galvanize public demand

Consumers
Embolden consumer demand for ethically sourced products
- Prefer ethically and sustainably sourced building materials and consumer goods
- Ask designers, construction firms, retailers, and local building suppliers if their materials are made with fair labor
- Practice conscious consumerism to choose products with intention and prioritize repairing or repurposing items to alleviate the waste stream
- Encourage reputational benefits for businesses with proven fair labor practices

Design for Freedom
Ethical Sourcing Tools

The Design for Freedom International Guidance & Toolkit aims to make it possible for all stakeholders in the built environment to:

- Take steps to better understand where forced labor risks may lie
- Build stronger and increasingly ethical and transparent supply chains
- Increase capacity within your own sphere of influence and beyond
- Decrease risks to businesses and projects
- Be an active part of the movement to eliminate forced and child labor from the building materials supply chain, creating a more humane and sustainable future

Whether you are an owner, engineer, architect, contractor, manufacturer, supplier or designer, we all have agency to design and build more humanely and actualize the Design for Freedom Principles:

- Find and Address Embedded Forced and Child Labor
- Pursue Ethical Decarbonization
- Prioritize Circularity.

Incorporating at least one upcycled, salvaged, or reclaimed product on every project is a good first step. It signals intent and can often be actioned relatively simply.

The Tools that follow will help you to undertake an analysis of risk and better understand the provenance of a project's materials. This is a powerful process which can yield valuable insights, allowing progress to be shared and compounded over time. It will also allow you to develop a strong narrative for both internal and external audiences and strengthen the business case for reducing the risk of forced and child labor in your supply chains.

Each project holds the potential to improve industry standards, build capacity, and bring awareness to partners, contractors, designers, engineers, manufacturers, suppliers, occupants, and clients of the risk of exploitative practices. By doing so it also adds to the industry's body of knowledge, drives broader engagement, and influences industry standards.

As part of the Design for Freedom movement, we all have our unique part to play as we drive towards decent work for all and the elimination of forced and child labor.

> "With a portfolio of projects in design and construction across the globe, OBO is working to move the needle of institutional change by partnering with our stakeholders to expand the industry's usage of ethically sourced building materials."
>
> Curtis Clay, Director of Architecture,
> U.S. Department of State's Bureau of Overseas Buildings Operations (OBO), at the Design for Freedom Ethical Supply Chain Workshop, November 2023

Tools-in-Action

Affirming Commitment
- Project Team and Supplier Engagement Letter to initialize conversations
- Ethical Design Requirements & Division Specifications to require ethical sourcing

Assessing Risk
- Self-Assessment Questionnaire to address known suppliers
- Slavery & Trafficking Risk Template (STRT) to further investigate areas of risk

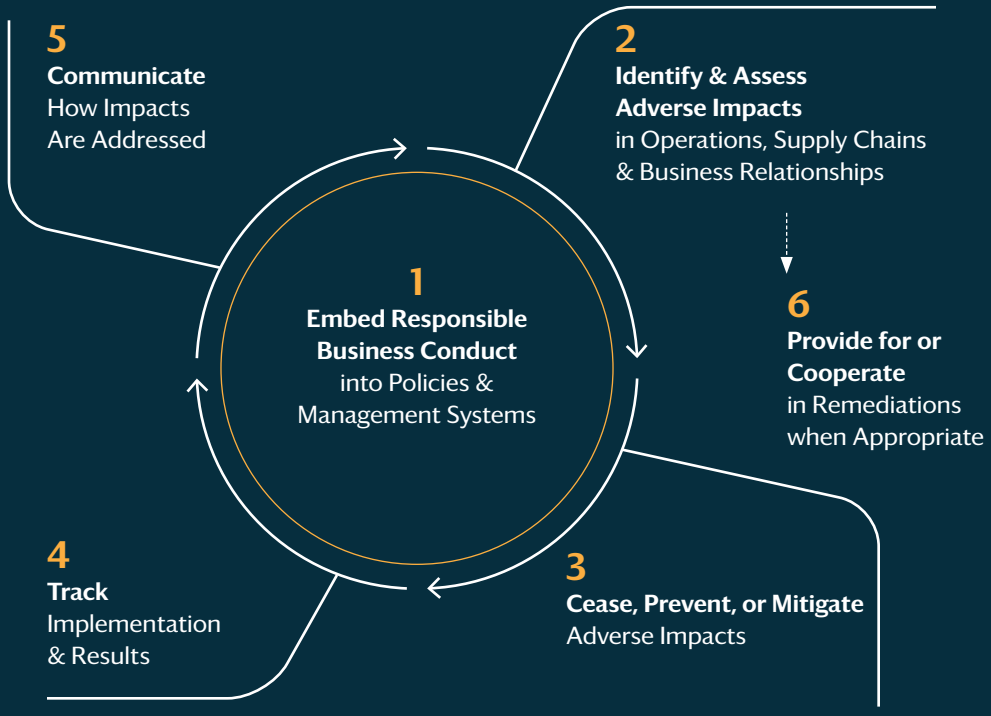
Connecting Data
- Ethical Materials Tracking Schedule to record identified materials by tier
- Responsible Certifications, International Frameworks & Standards to identify ethically sourced products and practices
- Supply Chain Risk Assessment Platforms and Technology to make data-informed decisions

Additional Resources
- Resources to learn more about civil society organizations, research, finance, due diligence and risk management, circularity, and prison labor
- Contract Language to create a binding commitment
- Glossary of Terms to expand your knowledge

Due Diligence Process Aligned with OECD

The Organization for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises on Responsible Business Conduct call on companies to carry out risk-based due diligence.

This due diligence process helps companies assess and address real and potential negative impacts in their operations, supply chains, and business relationships.



Steps to a Design for Freedom Aligned Project

Step 1
Build Organizational Capacity: What policies and processes do we have to guard against forced and child labor? What is forced and child labor? What high-risk materials do we source? Are we clear about our legal obligation? Engage and inform key decision makers, including procurement and finance. Get C-suite buy-in. Share the Design for Freedom Materials Analysis to be more informed.

Step 2
Understand Risks: Consider the tools available to help you to identify risks of child and forced labor. Take steps to identify where forced labor is most prevalent in your supply chains. Refer to the Supply Chain Risk Assessment Platforms and Technology research.

Step 3
Communicate Project Commitments and Requirements: Clearly communicate the requirements and set expectations within your internal team, project team members, and suppliers. Agree upon accountability measures and monitoring. Use Project Team and Supplier Engagement Letter.

Step 4
Implement Robust Procurement Systems and Processes: Consider a range of tools to help you identify areas of risk all the way through your supply chain. What systems and processes exist to underpin responsible procurement? Are they strong and can they be improved? Access Design for Freedom Resources to support this process.

Step 5
Inform suppliers and other stakeholders: Start a dialogue among manufacturers and building materials suppliers. Use the Project Team and Supplier Engagement Letter.

Step 6
Document Supply Chain Inputs: Find and Address Forced Labor and Prioritize Ethical Decarbonization and Circularity. Consider decarbonization through a human rights lens. Include recycled and regenerative materials where possible. Trace and record identified materials. Download the Self-Assessment Questionnaire, the Ethical Materials Tracking Schedule, Slavery and Trafficking Risk Template, and the Responsible Certifications & Standards List.

Step 7
Share Challenges and Successes: Include all parties in regular progress updates. Communicate positive impacts and challenges with a wide range of stakeholders internally and externally. Use learnings to review and improve practical application of this process. Celebrate successes. Join monthly Design for Freedom Office Hours. Share feedback and success stories with the Design for Freedom team through Office Hours.

Next Steps
Apply Contractual Commitments: Review and/or form contracts that include Design for Freedom commitments. Consider contractual clauses that can lower risk and use the sample Contract Language provided in this Toolkit.

Tools:

Project Team & Supplier Engagement Letter

Send the Project Team & Supplier Engagement Letter to clients, consultants, partners, and suppliers to initialize conversations across the project and secure commitments.

Given the disaggregated nature of the design and construction sector, we suggest distributing this letter broadly within your firms so that all are aware of your commitment to Design for Freedom Principles.

Use this link to access the Project Team & Supplier Engagement Letter.

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Dear [Contact],
Our company has made a commitment to work toward responsible supply chains which uphold and support human rights. As part of the Design for Freedom movement by Grace Farms, we are working to remove forced and child labor from the supply chains of the products and materials that are specified and procured on our projects. As a key stakeholder, we ask you to collaborate in this important work.

Almost 28 million people are working in forced labor conditions and close to 160 million children from the ages of five to 17 are subjected to child labor globally. Research consistently shows us that modern slavery is pervasive within the construction industry.

Design for Freedom harnesses the power of the built environment to uphold and support human rights and remove forced and child labor from the building materials supply chain. Together, our collective efforts will compound to create market transformation.

Three fundamental and inextricably linked principles guide our joint actions:

Find and Address Embedded Forced Labor - so that project stakeholders no longer profit from the slavery or exploitation discount..

Pursue Ethical Decarbonization - to recognize the link between the climate crisis and embedded forced labor in our building materials.

Prioritize Circularity - through shortening the supply chain by reusing and recycling materials, we reduce the risk of forced labor at the source or extraction level of the supply chain.

Our project team is fully supporting this movement, and we ask for your participation to help us to achieve our goal of greater equity and material transparency.

[Owner] [Designer] [Contractor]

Tools:

Ethical Design Requirements Specifications

Use Ethical Design Requirements Specifications to require contractors to meet ethical sourcing standards across the project materials or by spec division.

Use this link to access the Ethical Design Requirements, Design for Freedom Spec Format and Design for Freedom Wood Spec Reference.

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Instructions - Sample Specifications Language
The following sample specifications language is designed to accompany the Design for Freedom International Guidance & Toolkit, a resource developed by Grace Farms to assist architects and owners while they pursue responsible sourcing in practice. Architects and engineers may edit and incorporate this language into their existing specifications templates.

Review the Design for Freedom website, Report, Guidance & Toolkit to become familiar with the initiative in support of these goals.

Where practical, terminology used in this section has been made identical to or at least consistent with terminology used by Design for Freedom. Guiding humanitarian design principles contained herein are based upon the Design for Freedom Principles:

1. **Find and Address Embedded Forced Labor**
2. **Pursue Ethical Decarbonization**
3. **Prioritize Circularity**

Section 018113.63 Ethical Design Requirements (Template):
Use this as a standalone section or incorporate its language into the Division 01 Section of your choice. Edit this language to align with your project goals.

Design for Freedom Spec Format (Template):
Insert text from this template into technical specifications (Divisions 02 - 49) where appropriate. Revise as necessary for project-specific requirements in each section. Edit Part 1 and 2 lists to include only products specified in this section.

Design for Freedom Wood Spec (Sample):
This is an example of how to apply the provided language within a specific division. A sample wood spec has been created with established criteria which includes known certifications and circular product options.

Closed Specs:
For products that comply with Design for Freedom requirements, use 'closed spec' language to discourage submittal requests from subcontractors. Ideally, specify at least three compliant products.

Tools:

Design For Freedom Self-Assessment Questionnaire

A self assessment questionnaire is an effective tool to understand the labor practices of a supplier and address feedback regarding areas of concern.

The questionnaire is designed to be used in relation to specific products, product ranges, projects, or supply chains, and to assist with supply chain analysis.

As Design for Freedom seeks to further the work to eliminate forced and child labor, we put forward this self-assessment questionnaire to encourage organizations to assess progress, elevate internal dialogue, and promote external discussion.

Use this link to access the Design for Freedom Self-Assessment Questionnaire in PDF format.

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Self-Assessment Questionnaire

Our team is asking you to complete this self-assessment questionnaire in order to disclose transparency about your products. Please provide responses to each question below and provide back-up supplemental documentation as necessary.

Company Name _____

Date _____

Product Name _____

Product Number _____

Tools:

Slavery & Trafficking Risk Template

Removing financial and knowledge barriers to taking immediate action to identify risks.

The Slavery & Trafficking Risk Template, (STRT),[iii] is a free, open-source industry standard template used to assist companies in their efforts to comply with human trafficking and modern slavery legislation and improve their supply chain-related public disclosures. The STRT helps companies and their suppliers work together to build socially responsible supply chains by facilitating accurate data collection.

The template is a self-assessment questionnaire, in Excel format, used to collect data on human trafficking and modern slavery-related risks in supply chains. Companies can utilize the data collected to improve supply chain visibility, assess and mitigate risks, improve human trafficking-related public disclosures, and ensure compliance with human trafficking and modern slavery-related legislation.

The STRT facilitates human trafficking and modern slavery-related data collection and analysis, helping companies and their supply chains work together to engage in more ethical operations. The data collected gives companies visibility into their supply chain operations and helps them prioritize due diligence to mitigate risks.

The STRT is designed to meet the need for a universally accepted template among global supply chains. The template was developed with support and input from a consortium of stakeholders involved in the STRT Development Committee and is overseen by the Social Responsibility Alliance.

Use this link to access the STRT in Excel format.

iii "The Slavery & Trafficking Risk Template (STRT)," Social Responsibility Alliance (SRA).

Tools:

Ethical Materials Tracking Schedule

Project teams are encouraged to set manageable goals to actualize Design for Freedom Principles. One way to do this is to use the Ethical Materials Tracking Schedule.

Find and Address Forced Labor by investigating one material at a time, aimed to be traced from raw material extraction to arrival on the jobsite. When identifying materials, determine the selection based on project impact, in consideration of the size and complexity of the project. Utilize resources within the Ethical Materials Tracking Schedule to identify regions of high-risk for exploitation and transparency certifications that recognize the dignity of responsible supply chains.

Pursue Ethical Decarbonization by making carbon-conscious design decisions and utilizing carbon tracing strategies to provide visibility into labor practices within building material supply chains.

Prioritize Circularity by incorporating at least one upcycled, salvaged, or reclaimed product on every project.

Use the Ethical Materials Tracking Schedule to track and record identified products.

Use this link to access the Ethical Materials Tracking Schedule in Excel format.

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ETHICAL MATERIAL TRACKING SCHEDULE

PROJECT NAME:

PROJECT LOCATION:

MATERIAL INFORMATION								FIND & ADDRESS FORCED LABOR						ETHICAL DECARBONIZATION				CIRCULARITY		
PRODUCT TIER	HIGH RISK MATERIAL	HIGH RISK LOCATION	PRODUCT NAME	PRODUCT NUMBER/SKU	SUPPLIER NAME	VOLUME	COST	DFF SELF ASSESSMENT QUESTIONNAIRE	STRT	SLAVERY & HUMAN TRAFFICKING STATEMENT	ETHICS & COMPLIANCE POLICY	SUPPLIER CODE OF CONDUCT	CERTIFICATION	LCA	EPD	BIOBASED (VERIFIED BIOBASED	Building Transparency	SALVAGED, UPCYCLED, OR REUSED	PRE-CONSUMER RECYCLED CONTENT %	POST-CONSUMER RECYCLED CONTENT %
Tier 1																				
Tier 2																				
Tier 3																				

FOOTNOTES:
1. All materials to be procured/sourced in a sustainable and ethical manner according to Design for Freedom Principles
2. High-Risk Materials: Common building materials at risk for forced and/or child labor, as identified in the Design for Freedom International Guidance and Toolkit 2024.
3. High-Risk Locations: Countries of origin for building materials at high risk for forced and/or child labor, as identified in the Design for Freedom International Guidance and Toolkit 2024 and The ILAB List of Goods Produced by Child Labor or Forced Labor by the U.S. Department of Labor 2024
4. Responsible Certifications List: Identified by the Design for Freedom International Guidance and Toolkit 2024 for building material certifications which address labor practices. Refer to the Responsible Certifications List within the Design for Freedom Toolkit

Tools:

Responsible Certifications, International Frameworks, & Standards

Committing to transparency serves as a guidepost for designers when reviewing and specifying products.

While we acknowledge that we cannot "certify" our way out of the problem of forced labor in the building materials supply chain, we recognize that certifications can and should be part of the solution. Certifications and standards that include fair labor practices can illuminate the products, suppliers, and manufacturers that are taking steps to create responsible building materials supply chain.

Certifications within various categories highlight a commitment to responsible labor practices and industry standards. Industry focus centers on a sector or product specialty, while broad certifications encompass multiple product types. Third-party verified certifications ensure that an independent organization confirms compliance with labor practices, and responsible labor practices serve as a prerequisite for achieving certification at any level. Multi-tier certifications recognize labor practices throughout different levels of the supply chain, reinforcing the importance of ethical sourcing.

Standards play a crucial role, as many certifications adhere to international codes of conduct referenced across company, product, and building certifications. Company-level certifications reflect a commitment to ethical practices across a company's entire code of conduct or all product lines, while product-level certifications focus specifically on labor practices within individual product lines. Finally, building-level certifications acknowledge entire structures that utilize materials sourced through responsible labor practices.

Refer to the Responsible Certifications List within the Ethical Materials Tracking Schedule to filter relevant certifications by material or product type, third-party verification, industry focus, prerequisites, and other differentiators.

Use this link to access the Responsible Certifications Framework & Standards List in Excel format.

Company Level Certifications & Standards

Certifications and standards that reflect a commitment across a company's code of conduct or product lines.

Amfori's Business Social Compliance Initiative Audit*
Industry Focus: Broad
New for 2024 Toolkit, 3rd Party Verified, Labor Prerequisite

Provides Code of Conduct and System Manual to implement Business Supply Chain Initiative's (BCSI's) compliance methodology for human rights protection of workers' rights aligning with international standards by providing monitoring activities and digital solutions.

BES 6001: Responsible Sourcing, Construction Products
Industry Focus: Broad
3rd Party Verified, Labor Prerequisite

BES 6001 for construction supply companies to demonstrate compliance with ethical sourcing via a third-party auditing agency. It requires companies and their suppliers to adhere to international legal standards.

BES 6002: Ethical Labor Sourcing Standard
Industry Focus: Broad
3rd Party Verified, Labor Prerequisite

BES 6002 for companies to demonstrate compliance with legal and ethical standards related to eliminating forced labor from supply chains.

Better Cotton
Industry Focus: Textiles
3rd Party Verified, Labor Prerequisite

The Better Cotton Initiative works with farmers, companies, and stakeholders to promote more sustainable practices in cotton farming. BCI requires its members to adhere to labor standards that align with international norms including fair wages, safe working conditions, and the prohibition of forced and child labor.

Certified B Corp
Industry Focus: Broad
3rd Party Verified, Labor Prerequisite, Multi-Tier

B Corp certification means that businesses meet both the highest standards of third party-verified social and environmental performance. It signals to the world that a business is committed to public transparency and legal accountability in its effort to balance profit and purpose.

Copper Mark
Industry Focus: Copper/Upstream
3rd Party Verified, Labor Prerequisite

Copper Mark is based on 32 internationally-recognized criteria aligned with the United Nations Sustainable Development Goals (SDGs) and other global frameworks. The Copper Mark assurance process is implemented at site-level by independent third-party assessors. It applies to both copper mining and refining companies, helping them build trust with stakeholders and ensure responsible sourcing practices for their copper supply chain.

Ethical Stone Register
Industry Focus: Broad
3rd Party Verified (Verification Level)

The Ethical Stone Register is a unique resource created specifically for the natural stone industry in response to the 2015 UK Modern Slavery Act and the issues of sourcing materials responsibly. Independent auditors assess the journey of the material and ensuring that the responsible and ethical sourcing criteria are met the whole way along the supply chain at the Verification Level. Only verified stones will appear on the Register itself.

Fair Labor Association®
Industry Focus: Broad
3rd Party Verified, Labor Prerequisite

The Fair Labor Association (FLA) is a third-party auditor. The FLA conducts independent audits of companies to ensure they are complying with labor rights and ethical standards focusing on areas like health and safety, wages, working hours, freedom of association, and other key labor rights. These audits are part of their efforts to assess and improve working conditions within global supply chains. The FLA auditing process involves evaluating a company's compliance with the FLA's Code of Conduct, which is based on international labor standards, such as those set by the International Labour Organization (ILO). The FLA membership is available to companies, universities and affiliate organizations committed to improving labor standards in global supply chains.

Fair Stone
Industry Focus: Stone
3rd Party Verified, Labor Prerequisite

Fair Stone is an international social standard for natural stone imports from developing and emerging markets. Importers can become Fair Stone partners if they implement criteria within their supply chains that improves working conditions in stone processing factories and quarries.

Global Sustainable Enterprise System
Industry Focus: Broad
3rd Party Verified, Labor Prerequisite, Multi-Tier

A platform for measuring the sustainability performance, production process, and supply chain of a product, as well as the organization based on corporate social responsibility, sustainable procurement, CO_2 emissions, circular economy, and health and safety.

GRESB
Industry Focus: Broad
3rd Party Verified, Labor Prerequisite, Multi-Tier

GRESB is an industry-led organization that provides actionable and transparent ESG data to financial markets. GRESB assesses and benchmarks the ESG performance of real assets, including real estate and infrastructure, providing standardized and validated data to the capital markets.

Just Label
Industry Focus: Broad
Labor Prerequisite

From the International Living Future Institute, the Just Label is a voluntary disclosure tool for organizations to be rated based on how they treat employees, as well as their community and financial impacts.

Responsible Business Alliance
Industry Focus: Broad
3rd Party Verified, Labor Prerequisite

The Responsible Business Alliance (RBA) conducts third-party audits through a structured and rigorous process to ensure that member companies and their suppliers comply with standards including labor rights, health and safety, environmental impact, ethics, and management systems. RBA provides different tiers of certification, with the highest categories requiring external audits. Related Certifications: Responsible Factory Initiative.

Responsible Labor Initiative
Industry Focus: Electronics
New for 2024 Toolkit, 3rd Party Verified, Labor Prerequisite

A subsidiary of the RBA, the Responsible Labor Initiative (RLI) provides resources and auditing to meet requirements related to forced labor due diligence. RLI members are publicly listed, but their level of membership is not listed. The RLI also lists private recruitment agencies that are participating in their Responsible Recruitment Program.

Responsible Minerals Initiative (RMI)
Industry Focus: Minerals/Upstream/Electronics
3rd Party Verified, Labor Prerequisite

RMI offers companies and their suppliers a third-party audit to determine which smelters and refiners can be verified to responsibly source minerals, as well as a disclosure template to report on those who do so within their supply chains. As a member organization, RMI also helps train companies on risk management, regulatory requirements, OECD guidance, and international best practices for sourcing responsibly.

SGE 21 Ethical and Socially Responsible Management System
Industry Focus: Broad
3rd Party Verified, Labor Prerequisite

This standard allows for the implementation, auditing, and certification of an ethical and socially responsible management system. It certifies that companies commit to being responsible leaders within their industry and to their customers.

Social Accountability International SA8000 Standard
Industry Focus: Broad
3rd Party Verified, Labor Prerequisite

SA8000 Standard is maintained by Social Accountability International (SAI) to evaluate labor conditions that ensures the fair treatment of workers in factories and organizations around the world and is focused on labor conditions and validated by third-party audits, maintains a list of SA8000 certified entities and a grievance submission portal.

TCO Certified
Industry Focus: Electronics
3rd Party Verified, Labor Prerequisite

TCO Certified is a comprehensive, third-party sustainability certification for IT products that are independent of the IT industry and its buyers. It ensures that a product is socially and environmentally sustainable throughout its lifecycle.

World Fair Trade Organization
Industry Focus: Broad
3rd Party Verified, Labor Prerequisite

The WFTO is a global network and membership-based organization of Fairtrade enterprises rather than a certification body. Its main role is to advocate for and support businesses that are dedicated to fairtrade, providing a guaranteed fairtrade label to the entire organization. WFTO uses third-party audits to ensure that its member organization uphold the value of fair trade in all their operations including sourcing, production, and sales.

XertifiX Standard-Label
Industry Focus: Stone
3rd Party Verified, Labor Prerequisite

This standard, set by XertifiX, an NGO that supports and lobbies for improved working conditions and environmental protection in the Asian stone production industry, certifies that a factory, quarry, and company meet a set of values based on the International Labour Organization's core labor conventions.

Product Level Certifications & Standards

Certifications and standards that consider labor practices within specific product lines.

Aluminum Stewardship Initiative Chain of Custody Standard (v1); Aluminum Stewardship Initiative Performance Standard (v2)
Industry Focus: Metals/Upstream
3rd Party Verified, Labor Prerequisite, Multi-Tier

The Aluminum Stewardship Initiative (ASI) Chain of Custody Standard is part of a certification program designed to ensure that aluminum is produced responsibly, setting requirements for creating and maintaining a chain of custody for aluminum and aluminum products from production to end use.

American Tree Farm System
Industry Focus: Timber/Upstream
3rd Party Verified

Family forest owners can receive this five-step, third-party verified certification and become part of a network of sustainably-managed forestland.

The American National Stone Institute (ANSI) Sustainability Standard
Industry Focus: Stone/Upstream
New for 2024 Toolkit, 3rd Party Verified, Labor Prerequisite, Multi-Tier

The NSI Sustainability Assessment for Natural Dimension Stone includes fair labor practices, worker health and safety, and community engagement in its evaluation beginning at the Bronze level of certification.

Concrete Sustainability Council Certification
Industry Focus: Concrete
3rd Party Verified, Labor Prerequisite

The Concrete Sustainability Council offers a product certification for all products manufactured and supplied by a concrete plant. Cement and aggregate suppliers can also obtain a supplier certificate for responsible production standards.

Cradle to Cradle Product Certification
Industry Focus: Broad
3rd Party Verified (silver or higher), Multi-Tier

Cradle to Cradle is a certification for goods and material supply companies for both environmental and labor standards.It is primarily a general product certification with a sizeable number of AEC products including furniture.

Declare
Industry Focus: Broad
New for 2024 Toolkit, 3rd Party Verified, Labor Prerequisite

Declare is a transparency platform for building products which provides a label that communicates the ingredients and lifecycle impacts of products, helping designers and builders make informed choices.

Ethical Stone Register
Industry Focus: Broad
3rd Party Verified (Verification Level), Labor Prerequisite

The Ethical Stone Register is a unique resource created specifically for the natural stone industry in response to the 2015 UK Modern Slavery Act and the issues of sourcing materials responsibly.

Independent auditors assess the journey of the material and ensure that the responsible and ethical sourcing criteria are met the whole way along the supply chain at the Verification Level. Only verified stones will appear on the Register itself.

Fairtrade International
Industry Focus: Broad
3rd Party Verified, Labor Prerequisite, Multi-Tier

Fairtrade International is a certification body that sets global standards for fair trade ensuring that producers receive fair prices, better working conditions, and sustainable production methods. It is responsible for developing the Fairtrade Standards, certifying products, and enforcing fair trading practices. Companies need not meet all requirements initially but are required to demonstrate improvement. Certified companies must undergo annual third-party audits by FLOCERT, Fairtrade International's independent auditor which is an ISO 17065-accredited enterprise to ensure minimum standards are met.

Certifications which have been developed under the Fairtrade International framework include: Fairtrade America, Fairtrade Cotton Mark, Fair Rubber, Fairtrade Standard for Gold and Associated Precious Metals for Artisanal and Small-Scale Mining, and the Fairtrade Textile Standard.

Forest Stewardship Council Certification (FSC)
Industry Focus: Timber
3rd Party Verified, Labor Prerequisite, Multi-Tier

In 2021, FSC Core Labor Requirements were included in the FSC Chain of Custody Standard. These requirements cover the abolition of child labor, elimination of all forms of forced or compulsory labor, elimination of discrimination with respect to employment and occupation, upholding freedom of association, and the effective recognition of the right to collective bargaining.

There are three different types of FSC labels:

1. FSC 100%: all sourced materials of the labelled product come from FSC-certified forests
2. FSC Recycled: the materials used for the products are 100% recycled
3. FSC Mix: the product is made with a mix of materials from FSC-certified forests, recycled sources, and/or FSC controlled wood

Related Certifications: FSC Certified Viscose and FSC Rubber.

Global GreenTag MS Declaration
Industry Focus: Broad
3rd Party Verified

Global GreenTag is a globally recognized certification system that focuses on the sustainability and environmental impacts of products, primarily within the built environment (e.g., construction materials). The Global GreenTag Modern Slavery Declaration is a commitment by the certifying body to address and combat modern slavery within the supply chains of certified products.

Global Organic Textile Standard
Industry Focus: Textiles
3rd Party Verified, Labor Prerequisite, Multi-Tier

The Global Organic Textile Standard (GOTS) is a leading certification for organic textiles, covering the entire supply chain from the sourcing of raw materials to the final production stages, including social and environmental criteria. GOTS has comprehensive social criteria aligned with the principles of the International Labour Organization (ILO), ensuring ethical and safe labor practices throughout the textile production process.

Global Recycled Standard
Industry Focus: Textiles
3rd Party Verified, Labor Prerequisite

The Global Recycled Standard (GRS) is an internationally recognized certification that sets requirements for third-party verification of recycled content, chain of custody, social and environmental practices, and chemical restrictions.

GoodWeave Label
Industry Focus: Textiles, Brick
3rd Party Verified, Labor Prerequisite, Multi-Tier

GoodWeave is an organization that works to combat child labor, forced labor, and exploitative practices in global supply chains, particularly within the handmade carpet and textile industries. Products bearing the GoodWeave label are ethically produced, free from child and forced labor, and meet fair labor standards.
Related Certifications: Better Brick Nepal

GreenCircle Certified
Industry Focus: Organic
New for 2024 Toolkit, 3rd Party Verified

GreenCircle helps companies demonstrate their commitment to sustainability and human rights through transparent, science-based audits and certifications.

Initiative for Responsible Mining Assurance (IRMA) Certification
Industry Focus: Mining/Minerals
3rd Party Verified, Labor Prerequisite, Multi-Tier

IRMA's Standard for Responsible Mining defines good practices for what responsible mining should look like at the industrial scale. It provides the list of expectations that independent auditors will use as the benchmark for responsible mines.

International Tin Supply Chain Initiative
Industry Focus: Mining/Minerals
3rd Party Verified, Labor Prerequisite, Multi-Tier

A hybrid sustainability certification and supply chain mapping organization that offers members guidance on due diligence practices related to conflict minerals and makes evaluations publicly accessible. Manages tin, tantalum, and tungsten, which are used in built environment tools, alloys, and electronics.

Level by BIFMA
Industry Focus: Furniture
3rd Party Verified, Multi-Tier

From the Business + Institutional Furniture Manufacturers Association (BIFMA) comes LEVEL, a third-party certification program that signals the environmental and social sustainability of furniture products in the built environment.

Living Product Challenge (LPC)
Industry Focus: Broad
3rd Party Verified, Labor Prerequisite, Multi-Tier

The Living Product Challenge is a sustainable product certification program developed by the International Living Future Institute. One of the key components of the LPC is ensuring that the inputs used in product manufacturing includes the Fair Labor Imperative, which focuses on ensuring that labor practices across the product's supply chain are ethical and just.

Oeko-Tex Sustainable Textile and Leather Production (STeP)
Industry Focus: Textiles
3rd Party Verified

Companies must demonstrate that they meet both local regulations and international standards concerning labor practices.

Programme for the Endorsement of Forest Certification
Industry Focus: Timber/Upstream
3rd Party Verified, Labor Prerequisite, Multi-Tier

The Programme for the Endorsement of Forest Certification (PEFC) is a global alliance of national forest certification systems that promotes responsible forest management through independent third-party certification.
Related Certification: PEFC Rubber

Responsible Mica Initiative
Industry Focus: Mica/Upstream
3rd Party Verified, Labor Prerequisite

Responsible Mica Initiative promotes sustainable and ethical sourcing of mica, a mineral used in various products, including cosmetics, paints, and electronics, particularly in regions where child labor and unsafe working conditions are prevalent.

ResponsibleSteel Certification
Industry Focus: Steel/Upstream
3rd Party Verified, Labor Prerequisite, Multi-Tier

ResponsibleSteel is a global multi-stakeholder initiative that collaborates with IRMA, TSM, and RJC to promote responsible practices in the steel industry for mines, smelters, and other industrial processing organizations related to steel to prove adherence to environmental and labor standards.

Responsible Wool Standard
Industry Focus: Textiles (Wool)
3rd Party Verified, Labor Prerequisite

The Responsible Wool Standard (RWS) is a certification program that aims to improve the welfare of sheep and the land they graze on. The RWS includes requirements for animal welfare, land management, and social welfare.

SCS Global
Industry Focus: Broad
New for 2024 Toolkit, 3rd Party Verified, Multi-Tier

SCS Global Services (SCS) is a leading third-party certification and standards development company that provides independent auditing, testing, and certification services across various industries. SCS Global operates in sustainability, carbon footprint assessments, supply chain auditing, green building and construction, and responsible sourcing.

Sustainable Forestry Initiative
Industry Focus: Timber
3rd Party Verified, Labor Prerequisite, Multi-Tier

The Sustainable Forestry Initiative (SFI) was established in 1994 by American Forest & Paper Association (AF&PA) to promote responsible forest management. The certification was developed to engage a broad range of stakeholders to balance the needs of economic development and environmental protection.

Industry-Wide Rating Systems

Design for Freedom is working with these globally recognized non-profit industry organizations to continue to add transparency and due diligence within the building materials supply chain.

International Living Future Institute (ILFI) | Living Building Challenge
International WELL Building Institute (IWBI) | WELL
Social Equity Assessment Method (SEAM) **(New for 2024 Toolkit)**
U.S. Green Building Council USGBC | LEED

International Frameworks & Standards

International standards or codes of conduct that many certifications referenced in the Company, Product, and Building sections adhere to:

Building Responsibly Worker Welfare Principles
Industry Focus: Engineering/Construction
Building Responsibly serves as the global standard on worker welfare, addressing key areas of worker vulnerability to raise standards for the engineering and construction sectors.

Ethical Trading Initiative
Industry Focus: Broad
This is a framework for companies, trade unions, and voluntary organizations to conduct social audits and develop and implement ethical trade action plans.

Global Reporting Initiative
Industry Focus: Broad
The Global Reporting Initiative (GRI) provides a comprehensive framework for reporting on labor issues through several specific standards. These standards help organizations disclose their practices and impacts related to employment, labor rights, and working conditions in line with global best practices.

Organization for Economic Cooperation and Development (OECD)
Industry Focus: Broad
The OECD Due Diligence Guidance for Responsible Supply Chains provides a framework for companies to ensure that their supply chains are free from human rights abuses, environmental harm, and unethical practices.

UN Alliance 8.7
Industry Focus: Broad
UN Alliance focuses on Target 8.7 of the 2030 Sustainable Development Goals and is a global partnership taking immediate and effective measures to eradicate forced labor, modern slavery, human trafficking, and child labor.

Definition of Terms

Used in the Responsible Certifications, International Frameworks, & Standards sections

Broad: Certifications that specialize in multiple product types.
Company Level: Certifications that reflect a commitment across a company's code of conduct or product lines.
Industry Focus: Sector or product specialty for a certification.
Labor Prerequisite: Responsible labor practices are required to achieve certification on all levels of the certification.
Multi-Tier: Certifications that recognize labor practices across tiers of their supply chain.
Product Level: Certifications that consider labor practices within specific product lines.
Standards: International standards or codes of conduct that many certifications referenced in the Company, Product and Building sections follow.
Third-Party Verified: Third-party verification is the process of having an independent organization confirm labor practices.

Supply Chain Risk Assessment Platforms & Technology

Effective application of technology can facilitate exponential growth and widespread adoption of Design for Freedom Principles across the building materials supply chain. The following tools have been highlighted to address the roles technology can play to accelerate the movement. Understanding the diverse landscape of supply chain risk assessment platforms available can help facilitate visibility into supply chains for users that are both sourcing and manufacturing products. The central takeaway throughout this process is that there is not one solution to achieving responsible sourcing. In contrast, the key is finding a combination of programs that promote interoperability to achieve the optimal results for your company's position within the global value chain.

Design for Freedom activates all sectors of the built environment, and with the use of technology we can work together to achieve standardization of responsible sourcing transparency practices. The following organizations have been interviewed by the Design for Freedom team and members of the Design for Freedom Working Group for inclusion in the Design for Freedom International Guidance & Toolkit. Many of these platforms utilize publicly available sources such as The U.S. Department of Labor's List of Goods Produced by Child Labor or Forced Labor, Trafficking in Persons Report or The Global Slavery Index, in addition to their own entity research.

Each program aims to work together to achieve social equity in supply chains delivering at least one of the following services:

1. **Risk Assessment**: Understanding potential supply chain risk relating to reported human rights violations, political activity, economic risks, and climate change.
2. **Source Data**: Comprehensive resource released periodically that evaluates the actions taken by countries to address forced and child labor.
3. **Entity Matching**: Mapping a product's end-to-end supply chain utilizing AI technology and verified data sources.
4. **Entity Research**: Providing verified site-specific supplier data in real time.
5. **Material Provenance**: Product origin verification technology.
6. **Supplier Rating**: Companies that evaluate and score performance for fair labor.
7. **System of Records**: Preparing documentation for compliance with International Trade Laws.
8. **Legal & Financial**: Utilizing ESG rating criteria, investors assess risk within supply chains to safeguard their investments.
9. **Sourcing Platform**: Platforms focused on identifying large-scale suppliers with ethical transparency data for procurement.
10. **Transparency Collaborator**: Industry leaders that recognize responsible organizations and products that include third-party certifications and material disclosure.

Interoperability Chart

If supply chain mapping visibility or responsible sourcing documentation is not readily available for a product, users can refer to the Supply Chain Risk Assessment Platforms and Technology Programs listed in the interoperability chart below.

For materials with a country of origin identified, utilize the Risk Assessment sources to understand the associated likelihood that embedded forced or child labor would occur within their supply chain.

For products with a defined supply chain, utilize mapping and data technology to achieve visibility across tiers and meet international legislative compliance.

Design for Freedom Assessment | Supply Chain Technology Interoperability

Broad

Risk Assessment

FAIRSUPPLY

Verité Fair Labor. Worldwide

Source Data

WALK FREE

Targeted

Entity Matching

Altana

SAYARI

Entity Research

KHARON

Material Provenance

ORITAIN

Supplier Rating

ecovadis

System of Records

FRDM

Sedex

Sourcemap

Legal & Financial

Bloomberg

Thomson Reuters™

Sourcing Platform

3E

BuildingEase

OPEN SUPPLY HUB

Transparency Collaborator

cradle to cradle

INFORMED

INTERNATIONAL LIVING FUTURE INSTITUTE

mindful MATERIALS

Area of Risk → **Supply Chain** → **Compliance** → **Procurement** → **Design**

Risk Assessment

FairSupply
Type: Risk Assessment
FairSupply, based in Australia, specializes in mapping supply chains by identifying and visualizing the various components and relationships within a company's supply network, from raw material sourcing to final product delivery. The mapping process helps identify potential risks in the supply chain, such as suppliers located in regions prone to environmental or social issues, allowing companies to proactively address these risks in early decision-making on a project. FairSupply has a significant construction materials database.

Verité
Type: Risk Assessment
Verité provides two platforms to help companies map and manage human rights risks within their supply chain. Utilizing data from the United States Office to Monitor and Combat Human Trafficking in Persons (TIP), Verité's Responsible Sourcing Tool (RST) is a comprehensive resource that provides practical tools and resources to promote responsible sourcing practices through country risk profiles and sector-specific risks. Verité Cumulus is a complementary tool for companies to input detailed information about their suppliers including self-assessment questionnaires.

Walk Free
Type: Source Data
Walk Free is an international human rights group focused on eradicating modern slavery globally. Created by Walk Free, the Global Slavery Index reveals the number of people held in modern slavery ranked by country as well as data on how governments and organizations are responding to the risk.

Supply Chain Mapping & Transparency

Altana
Type: Entity Matching
The Altana Atlas platform is an advanced AI-driven model that provides dynamic, multi-tier visibility into global supply chains. It integrates data from a variety of sources, both public and private, to create a living map that evolves as supply chain networks change, mapping nearly 45% of the global value chain. Altana incorporates third-party risk analytics and ESG data, allowing companies to manage supply chain risks and measure their environmental and social governance performance through a custom dashboard.

Sayari
Type: Market Intelligence
Sayari is the counterparty and supply chain risk intelligence provider trusted by government agencies, multinational corporations, and financial institutions. Its intuitive network analysis platform surfaces hidden risk through integrated corporate ownership, supply chain, trade transaction, and risk intelligence data from over 250 jurisdictions.

Kharon
Type: Entity Research
Founded by former members of the U.S. Treasury, Kharon collects data from a wide range of public and proprietary sources, including government databases, financial records, corporate filings, news reports, and other relevant documentation. The mapping technology identifies entities and regions that may be subject to sanctions or other regulatory restrictions, honing in on undocumented suppliers often not recognized by supply chain mapping companies. This data helps companies avoid doing business with prohibited parties and comply with international regulations.

Oritain
Type: Material Provenance
Oritain, a company specializing in supply chain mapping, uses advanced technologies such as AI and machine learning to enhance supply chain visibility and efficiency. Their solutions are designed to track and verify the origin of products, ensuring authenticity and compliance with various standards through isotope tracing technology. Oritain is often utilized for products that receive a premium for assuring a purity of their products, such as cotton.

EcoVadis
Type: Supplier Rating
EcoVadis provides globally trusted sustainability intelligence on an interactive platform to help organizations comply with ESG regulations and improve the sustainability performance of their value chains. Scorecards, benchmarks, tools, and insights guide an improvement journey for environmental, social, and ethical practices.

FRDM
Type: System of Records
FRDM is a solution that uses basic supplier data to map, monitor, and mitigate human rights and climate risks in supply chains. FRDM provides supply chain visibility, sustainability, and responsible sourcing through data assessment, risk management integration, traceability, automation of compliance reporting, and supplier risk scoring.

Sedex
Type: System of Records
Sedex provides end-to-end supply chain solutions for businesses, including SMETA, a site-level social audit. The platform, tools, and services enable businesses to easily manage and improve their environmental, social, and governance (ESG) performance to meet their supply chain sustainability goals.

Sourcemap
Type: System of Records
Sourcemap is a supply chain mapping and transparency platform that helps organizations track, manage, and optimize their supply chains. The system of records in Sourcemap's supply chain mapping involves collecting documentation, self-assessment questionnaires, third-party audits, and AI tracking to provide information about every entity in the supply chain to ensure traceability, compliance, and risk management.

Bloomberg ESG and Sustainable Finance Solutions
Type: Legal & Financial
Bloomberg ESG and Sustainable Finance Solutions is used by investors, analysts, and corporations to assess how well a company is managing risks and opportunities related to sustainability and ethical practices. Accessible through the Bloomberg terminal, Bloomberg provides ESG rating scores in real time for over 50,000 companies worldwide, from raw material suppliers to global real estate companies.

Thomson Reuters ONESOURCE Supply Chain Compliance Tool
Type: Legal and Financial
ONESOURCE is an integrated offering to increase visibility, manage compliance, and mitigate risks across the supply chain, including forced labor. The program automates and streamlines various trade processes, ensuring companies stay compliant with global regulations while minimizing risks and costs associated with import/export activities.

3E
Type: Sourcing Platform
3E supports social equity by advancing sustainable supply chains and ensuring product compliance across industries. Manufacturers often use 3E technology to collect transparency information for Declare labels and other key certifications. By automating supplier data collection and compliance reporting through Digital Product Passports, 3E has streamlined data-sharing along the supply chain to meet mutual product goals that can be easily shared between suppliers, distributors, and end-users cohesively.

BuildingEase
Type: Sourcing Platform
BuildingEase is a platform designed to streamline the management and procurement of building products while promoting sustainability and waste reduction. It helps firms and teams improve their workflows by optimizing building product selection, management, and procurement processes.

Open Supply Hub
Type: Sourcing Platform
Open Supply Hub is an open-source, collaborative platform designed to improve visibility into where products are made, enabling more responsible and sustainable sourcing practices. By providing detailed information about supply chains, the platform helps companies and consumers have a greater understanding of the potential risk. However, Open Supply Hub does not require participants to provide verified responsible sourcing data. Open Supply Hub recognizes the solar sector as an emerging market taking advantage of the open-source platform with over 1,400 suppliers.

Cradle to Cradle
Type: Transparency Collaborator
Cradle to Cradle (C2C) is a transparency database that emphasizes sustainability and circularity in product life cycles. When it comes to labor practices, C2C advocates for fair labor conditions that ensure safe, equitable working environments with fair wages and rights for all workers.

Informed
Type: Transparency Collaborator
Informed is built upon Habitable's more than 20 years of comprehensive research into building materials and their associated hazards. Based on analysis of six evaluation criteria, Informed visualizes the potential health impacts of different building products on people (including workers, fence line communities, and building occupants) and the environment throughout the product life cycle.

International Living Future Institute
Type: Transparency Collaborator
The International Living Future Institute (ILFI) is an organization dedicated to promoting sustainable building practices through initiatives like the Living Building Challenge.
Their transparency efforts focus on encouraging open sharing of data about materials, products, and building performance to foster social equity accountability and innovation in the industry.

mindful MATERIALS
Type: Transparency Collaborator
The Mindful Materials Common Materials Framework (CMF) promotes social equity by encouraging the use of building materials that support human rights and fair labor practices throughout the supply chain. The framework is structured around five key sustainability areas: human health, climate health, ecosystem health, circularity, and social health and equity.
By integrating social health and equity into its criteria, CMF pushes companies to adopt practices that respect and protect human rights, minimizing exploitation, and promoting equitable outcomes across global supply chains.

Additional Resources

Civil Society Organizations

Anti-Slavery Collective
Unicef Child Rights and Business
International Labour Organization
Organization for Economic Cooperation and Development (OECD)
United Nations Guiding Principles on Business and Human Rights

Reports, Research & Tools

A Blueprint for Mobilizing Finance Against Slavery and Trafficking
Global Estimates of Modern Slavery, ILO
Helena Kennedy Centre for International Justice at Sheffield Hallam University
Interactive Map for Business of Anti-Human Trafficking Organisations
International Trade Union Confederation - Global Rights Index
MIT Living Wage Calculator
Modern Slavery Statement Registry
University of Nottingham Rights Lab
ReStructure Lab
Supply Chain Sustainability School
UNEP Building Materials and the Climate: Constructing a New Future, Report, September 2023
UNEP Global Material Flows Database
United Nations Development Programme: Human Development Reports - Gender Inequality Index (GII)
U.S. Department of Labor - Findings on the Worst Forms of Child Labor
2024 World Justice Project Rule of Law Index®

Supply Chain Mapping Intelligence

Bureau Veritas
CERES Supplier Self-Assessment Questionnaire
ELEVATE Global Trace Protocol Project
EVRYTHNG Product Cloud®
Fighting Modern Slavery and Human Trafficking Certificate
IPRO - Modern Slavery Toolkit
OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas
Panjiva Supply Chain Intelligence

Due Diligence and Risk Management

AA1000 Assurance Standard
Business for Social Responsibility (BSR)
Chinese Due Diligence Guidelines for Responsible Mineral Supply Chains
Conflict-Free Sourcing Initiative (CFSI)
Corporate Register for CSR Reports
Consumer Goods Forum: Sustainable Supply Chain Initiative (SSCI)
E2open
Equitable Origin
EO100 Standard for Responsible Energy
Everyone's Business
Guide on Social Responsibility for Chinese International Contractors
ISO 26000
(IHRB) Institute of Human Rights Business
Know The Chain
UN Global Compact Communication on Progress
S&P Global Dow Jones Index ESG Score Methodology
Social Hotspots Database
Stronger Together US
Together for Sustainability
Verisk Maplecroft

Environmental and Social Standards

Building Transparency: Map of Manufacturers with EPDs
EcoLabel Index
EJScreen: Environmental Justice Screening and Mapping Tool
Habitable
HPD Open Standard
ISEAL
Mindful MATERIALS
Sustainable Minds Transparency Catalog
World Benchmarking Alliance

Circularity

Circular Construction Lab, Cornell University
Ellen MacArthur Foundation
National Renewable Energy Laboratory: Circular Economy Modeling and Analysis
United Nations Environment Programme: Building Circularity
World Circular Economy Forum

Biobased Materials

Circularity and Biobased Materials in Architecture and Design
Global ABC: Sustainable Materials Hub

Prison Labor

Brennan Center for Justice
Captive Labor Exploitation of Incarcerated Workers, ACLU
Justice and Prison Reform, UNODC
Yale Center for Ecosystems + Architecture
Prison Labor and Modern Slavery, Freedom United
Worth Rises Prison Industry Corporate Database

Contract Language

A contract can be a powerful tool to advance supply chain transparency and integrate Design for Freedom Principles into projects.

Following are possible waiver/elections for your lawyer's consideration while negotiating your contracts. Construction and design contracts come in many forms representing many different delivery methods. They are complicated legal instruments. Before you rely on this form, please seek legal counsel from your own construction lawyer. This form is not intended for projects outside the United States.

CONTRACT APPENDIX REGARDING DESIGN FOR FREEDOM

FOR ARCHITECTURE FIRM TO GIVE TO OWNER/CLIENT

FOR PROJECTS IN THE UNITED STATES

Owner's Election or Waiver of
Design for Freedom Principles
Regarding Anti-Forced Labor and Anti-Trafficking Laws

Legal Landscape

In the United States, since the 1930s, the Smoot Hawley Tariff Act has prohibited the importation of any goods or materials manufactured in whole or in part with forced labor. However, for decades, many in the United States relied on a workaround provision that allowed an exception when the goods or materials did not meet the "consumptive demands" of the United States.

In 2016, the United States Congress closed that loophole entirely when it passed the Trade Facilitation and Trade Enforcement Act ("TFTEA"). Regardless of intent, therefore, and without exception, TFTEA prohibits the importation of anything manufactured with any amount of forced labor into the United States. This prohibition includes building materials.

In addition, the Uyghur Forced Labor Prevention Act ("UFLPA"), enacted in 2021 with a 2022 effective date, creates a rebuttable presumption that goods mined, produced, or manufactured wholly or in part in Xinjiang or by an entity on the UFLPA list are prohibited from U.S. importation.

As a result of TFTEA, without appropriate investigation in building materials supply chains, as outlined in the attached Design for Freedom proposal, it is more likely that any building materials ordered by the Contractor or any of its Subcontractors could inadvertently fall into a prohibited category, leading to seizure at the border or a "withhold release order" ("WRO") issued by United States Customs and Border Protection. A WRO can negatively impact the substantial completion deadline in the [insert title of project agreement].

While the Architect will procure the professional liability insurance required under the [insert title of project agreement], such insurance generally covers only negligent acts and omissions committed by the Architect, or those that are not compliant with the relevant standard of care. In general, professional liability policies do not cover independent breaches of contract. As of the date of the [insert title of project agreement], consultation and investigation regarding compliance with TFTEA and UFLPA is not necessarily within an architect's standard of care. As such, there is a risk that any damages associated with a WRO or violation of TFTEA caused in whole or in part by the Architect's Instruments of Service will not be covered by the professional liability policy. However, following the steps outlined in the attached Design for Freedom proposal can mitigate such risk.

Election or Waiver

Election of Design for Freedom Principles

____In response to the foregoing, and notwithstanding anything to the contrary contained in the [insert title of project agreement], the Owner hereby elects to include the Design for Freedom proposal as Supplemental Service to the [insert title of project agreement]. The Owner hereby acknowledges that such election shall not guarantee full compliance with TFTEA or UFLPA, as such strict compliance remains elusive.

_____
Owner Signature

Waiver of Design for Freedom Principles

____The Owner hereby acknowledges receipt of the foregoing and elects not to include the Design for Freedom proposal as a Supplemental Service to the [insert title of project agreement]. Notwithstanding anything to the contrary contained in the [insert title of project agreement], the Owner hereby acknowledges that failure to include the Design for Freedom proposal as a Supplemental Service increases the likelihood of a violation of TFTEA or UFLPA which could potentially negatively impact the substantial completion deadline identified in the [insert title of project agreement].

_____
Owner Signature

Use this link to access Contract Language for Architects.
Use this link to access Contract Language for Contractors.

Glossary of Terms

Design for Freedom
A movement by Grace Farms to harness the power of the built environment to uphold and support human rights and remove forced and child labor from the building materials supply chain.

Design for Freedom Principles
1. **Find and Address Forced Labor**: Know your risks back to raw materials, work in collaboration to address forced labor, and promote transparency, and the decent work agenda.
2. **Pursue Ethical Decarbonization**: Analyze decarbonization plans and product development through a human rights lens.
3. **Prioritize Circularity**: Standardize and document the use of salvaged, upcycled, reclaimed, and innovative products, and challenge existing business models.

Child labor
Work that deprives children of their childhood, their potential and dignity, and that is harmful to physical and mental development. It refers to work that is mentally, physically, socially, or morally dangerous and harmful to children and/or interferes with their schooling.[iv]

Circular economy
A circular economy is a global economic model that aims to decouple economic growth and development from the consumption of finite resources. Measuring how effective a company is in making the transition from 'linear' to 'circular' models is still in its infancy.

Closed loop
In a closed loop, used products come back to the manufacturer and components or materials are used again to produce new products of the same type.

Decent work
Decent work sums up the aspirations of people in their working lives. It involves opportunities for work that is productive and delivers a fair income, security in the workplace and social protection for all, better prospects for personal development and social integration, freedom for people to express their concerns, organize, and participate in the decisions that affect their lives and equality of opportunity and treatment for all.[v]

Debt bondage
Being forced to work to repay a debt and not being able to leave because of a debt. Just over half of forced labor victims worldwide are held in debt bondage.[vi]

Disclosure
All information released by a company for the purpose of informing shareholders or other stakeholders.[vii]

Downstream
Delineates those production activities in supply chains that occur closest to retail.

Ethical decarbonization
Minimizing the risk of embodied suffering in parallel to the movement to minimize embodied carbon, creating a synergy between environmental and social justice goals.

iv "What is child labor." International Labour Organization.
v "Decent work." International Labour Organization.
vi"What is bonded labour?" Anti-Slavery International.
vii "UN Guiding Principles Reporting Framework." UN Guiding Principles on Business and Human Rights, 2017.

Ethical sourcing
The process of ensuring that the products made are obtained through responsible and sustainable methods. This includes ensuring that the workers who make the products are paid a fair wage and all human rights are met, the factories are clean and safe environments to work in, and that all social and environmental aspects of production to the workers and the surrounding communities are considered.

Forced labor
All work or service which is exacted from any person under the threat of a penalty and for which the person has not offered themselves voluntarily.[viii]

Fully linear product
A product that is made purely from virgin material and it completely goes into landfill or energy recovery after its use.

Human rights
Basic international standards aimed at securing dignity and equality for all. Every human being is entitled to enjoy them without discrimination. They include the rights contained in the International Bill of Human Rights – meaning the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights, and the International Covenant on Economic, Social and Cultural Rights. They also include the principles concerning fundamental rights set out in the International Labour Organization's Declaration on Fundamental Principles and Rights at Work.[ix]

Human trafficking
The recruitment, transportation, transfer, harboring, or receipt of persons, by means of the threat or use of force or other forms of coercion, of abduction, of fraud, of deception, of the abuse of power or of a position of vulnerability, or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purpose of exploitation.[x]

Living wage
A living wage is an essential aspect of decent work to ensure that all workers, families, and communities can live in dignity. It is a wage that enables workers and their families to meet their basic needs.[xi]

Mitigation
The mitigation of a negative human rights impact refers to actions taken to reduce the extent of the impact. The mitigation of a human rights risk refers to actions taken to reduce the likelihood that a potential negative impact will occur.[xii]

Modern slavery
Used as an umbrella term covering practices such as forced labor, debt bondage, forced marriage, and human trafficking.[xiii]

Remediation/Remedy
Refers to both the process of providing remedy for a negative human rights impact and the substantive outcomes that can counteract, or make good, the negative impact. These outcomes may take a range of forms such as apologies, restitution, rehabilitation, financial or non-financial compensation, and punitive sanctions (whether criminal or administrative, such as fines), as well as the prevention of harm through, for example, injunctions or guarantees of non-repetition.[xiv]

viii "Global Estimates of Modern Slavery Forced Labour and Forced Marriage." International Labour Organization (ILO). Geneva, 2022.
ix "The Foundation of International Human Rights Law." United Nations.
x "2024 Trafficking in Persons Report." U.S. Department of State.
xi "Ensuring a Living Wage is an Essential Aspect of Decent Work." United Nations Global Compact.
xii The Foundation of International Human Rights Law." United Nations.
xiii "Global Estimates of Modern Slavery Forced Labour and Forced Marriage." International Labour Organization (ILO). Geneva, 2022.
xvi Ibid.

Risk
A situation that increases the potential for damage to a company, such as reputational damage or legal liability, or damage to individuals or entities affected by a company's activities or linked to a company's operations, products, or services through business relationships.

Supply chain
The sequence of processes involved in the production and distribution of a commodity, implying that it considers the steps necessary to get a final product to the consumer.[xv]

Supply chain transparency
Involves two components: visibility and disclosure. Visibility is accurately identifying and collecting data from all links in the supply chain. Disclosure is communicating that information, both internally and externally, at the level of detail required or desired by the consumer or specifier.

Tier 1 suppliers
Tier 1 suppliers are partners with whom you directly conduct business. They are easily identified as companies with whom you transact financially in the procurement process.

Tier 2 Suppliers
It is simplest to identify Tier 2 suppliers as the sources where your Tier 1 suppliers get their materials.

Tier 3 suppliers
Tier 3 suppliers or partners are one step further removed from a final product and can work in raw materials. In complicated supply chains, there can be 10 or more tiers.

Upstream
Refers to production processes in supply chains that occur closest to raw material production.

Value chain
The process or activities by which a company adds value to an article, including production, marketing, and the provision of after-sales service, going from the raw materials, until the final product.[xvi]

xv International Labour Organization, "What Are Supply Chains," Global Supply Chains Terminology, 25 May 2016.

Verisk Maplecroft Data Terminology

Climate Hazard and Vulnerability
The Climate Hazard and Vulnerability Indices assess the potential for adverse consequences arising from the interaction between physical climate hazards and the vulnerability of affected human systems. In combination, the indices provide a consistent view of the susceptibility of human populations to the impacts of chronic and acute climate hazards under three emissions pathways and time periods. The index combines the three pillars of climate hazards exposure, human sensitivity, and the adaptive capacity of countries to provide a unique measurement of the socio-economic impacts of climate change.

Corruption
The Corruption Index assesses risk by modelling the strength of anti-corruption legislation, the efficacy and independence of anti-corruption bodies, and the prevalence of corruption from a business perspective, including distribution, petty, and grand corruption.

Forced Labor
The Forced Labor Index indicates the risk to business of the association with practices of the extraction of work or services from an individual under the menace of any penalty and without consent. Businesses face reputational and associated financial risks if allegations of complicity in the use of forced labor practices occur in its direct operations as well as in the supply chain. In addition, business can face legal and financial risks as a result of criminalization of forced and bonded labor practices under national legal systems. The index uses the UN's structure and process outcome framework to measure the strength of laws, how well they are enforced, and the severity and frequency of violations.

Poverty
The Poverty Index quantifies multidimensional aspects of poverty for more than 3,000 sub-national administrative units globally.

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