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MODERN SLAVERY IN CONSTRUCTION ENGINEERING INDUSTRY: CHALLENGES AND OPPORTUNITIES

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Abstract: Complex supply chains, temporary work and employment, and the extensive use of subcontracting in the construction sector create the perfect conditions for exploitation. Construction businesses have an important role in tackling modern slavery. With the new Canadian act to fight modern slavery expected to come into force in 2020, construction engineering companies must take actions to comply. Many are under the impression that slavery occurs in extreme conditions and remote locations, but it is a modern, everyday problem. This article reviews how modern slavery affects the construction industry and what companies and the industry can do to remediate this issue. Modern slavery in supply chains and construction workers are discussed according to the uncertain and shifting industry that is construction. The volume and the transparency of information as well as the lack of legislation are the main challenges that need to be solved. Some positive developments and potential solutions such as increased awareness, certification and industry self-regulation will be presented as ways to reduce the potential harm of modern slavery in the sector. Also, different technologies already used in other industries and for other functions can enable full transparency and benefit from Big Data. Blockchain, the Internet of Things and Artificial Intelligence have the potential to help companies tackle modern slavery.

1 INTRODUCTION

Construction is a high-risk industry (Iqbal et al. 2015). The widespread use of agency workers and migrant labor in some country, and the constant pressure on prices have defined the sector's business models (CIOB 2018). While these models do not lead directly to slavery, they create an environment where it is easier to exploit and for criminality to infiltrate supply chains. A single supply chain for a major contractor could consist of hundreds of subcontractors, labor agencies and material suppliers. Behind the first or second tiers of their supply chain, companies have blurred vision and verifying every transaction becomes impossible (CIOB 2016). Labor and procurement of building materials are the two elements with a high-risk of involving modern slavery in the construction industry (Elgg 2016). With social pressure and awareness constantly increasing, Canadian government is expected to pass a bill to tackle modern slavery in early 2020 (Canada 2018). Within this context, Canadian construction engineering companies, especially those working abroad and/or providing contracting services, must take actions. This short review will first present the problematic of modern slavery in the construction engineering industry. Secondly, positive developments and possible technical solutions will be addressed. Finally, a discussion about what Canadian companies should do to prepare for that bill and what is currently being done by some companies end this article.

2 MODERN SLAVERY IN CONSTRUCTION ENGINEERING INDUSTRY

Modern slavery constitutes a major compliance and integrity issue for companies. Indeed, there are more than 40 million modern slaves currently (Anti-slavery international 2018). Most of them are in Asia (30 million) and Africa (9 million), but also in North America (420 000) and Europe (1,25 million) (Walk Free Foundation 2018). Out of the 150 billion USD of illegal profits generated through modern slavery annually, 34 billion USD are made in the construction, mining and utility industries (Institute of development studies 2018, Elgg 2016). Modern slavery takes many forms in the construction engineering industry (Scarpa 2008, Anti-slavery international 2018):

- Forced labor: work or services forced against the will or under some form of threat;
- Bonded labor: people who borrow money they cannot repay and are required to pay off the debt. They often lose control over their conditions of employment and debt;
- Human trafficking: transporting, harboring or recruiting to exploit by using threats, violence and coercion;
- Descent-based slavery: people who are born in slavery because their ancestors were captured or enslaved;
- Child slavery: not to be confused with child labor, child slavery is when a child is exploited for someone else's gain.

With globalization, the products of modern slavery cross borders. It is important to assess the problem not only from the perspective of where the crime is committed but also where the products of the crime are sold and consumed (Walk Free Foundation 2018). Countries with repressive regimes, where populations work to prop up the government and countries with conflicts resulting in the breakdown of laws, social structures and systems of protection are more prone to modern slavery. This notwithstanding, countries with high GDP are also subjected to modern slavery, particularly for migrants, homeless and minorities (Hernandez and Rudolph 2015, UK Department of Justice 2018). While many actions must be taken by governments, the first recommendation of the Global Slavery Index is related to businesses and states that they should prioritize human rights in decision-making and ensure they are not contributing or benefiting from modern slavery (Walk Free Foundation 2018).

2.1 Supply Chain

No other industry uses more materials by weight than the construction industry (Horvath 2004). One of the first areas to address modern slavery is to determine where it exists in supply chains (Walk Free Foundation 2018). Social themes have been overlooked by researchers studying sustainable supply chain (Reefke and Sundaram 2017) and that these issues are especially problematic for developing nations (Mani et al. 2016). Construction engineering companies have numerous supply chains with specific features (Behera, Mohanty, and Prakash 2015):

- Customers: They exercise great influence on the final product, the logistics and are numerous;
- Fragmentation: Many subcontractors, institutions and vendors involved trying to meet different and incompatible business purposes;
- Stakeholders: Network involving multiple relations and organizations with flows of information, materials, services, products and funds between clients, designers, contractors and suppliers;
- Buyer-supplier relationship: Tender price being the most significant parameter for bid evaluation (especially in the public sector) lead to conflicts, mistrust and delivery problems;
- Multiple temporary organization: Relationships focused on short-term thinking, scarred by leverage and opportunism;
- Change inertia: Construction organisations tend to be conservative;
- Make-to-order supply chain: Clients are the source of changes and this leads to conceptualization of supply chain process starting and ending with the client;
- Cyclical demand: Highly cyclical industry because the output is durable.

All these features make it even harder for construction engineering companies to tackle modern slavery. Global, outsourced and interconnected supply chains make transparency difficult (Gold, Trautrim, and Trodd 2015). Detecting modern slavery is very challenging and may even be more difficult to detect than

other social issues (New 2015). It has been discussed that there is heterogeneity in the practices and approaches used by companies resulting in confusion among industries (Stevenson and Cole 2018). The transparency and volume of information are the main challenges to remediate modern slavery in the supply chain.

2.2 Construction Workers

Construction is a highly cyclical industry resulting in cyclical workforce demand. Construction workers are subject to economic volatility, mobility and employment insecurity (Meardi, Martín, and Riera 2012). To adapt to that flexibility and uncertainty, some organizations see workers as disposable assets, especially the most vulnerable ones (migrants, undocumented, homeless, unskilled, etc.). In developed countries, this situation mostly occurs in the black economy (Stronger Together 2019). According to Quebec’s construction commission, 30% of construction activities in Quebec fall into black economy (CCQ 2015). Another study estimates that construction has a 3.56% share of Germany’s official economy while having a 36.36% share of their black economy (Kirchgässner 2017). This results in a situation where vulnerable workers feel trapped. Another problem is that companies who hire such workers are often unaware of their situation. Indeed, workers are often exploited during the recruitment process by temporary-work agencies via recruitment fees, papers’ confiscation, contract substitution, poor accommodation and unfair deductions (Stronger Together 2019, Cockbain and Brayley-Morris 2017). Migrant workers, especially new arrivals, are often seen as hard workers, loyal, reliable and prepared to work longer hours because of their lack of choice, and the important volume of available unskilled labor intensifies competition and enables contractors to choose the “best” migrant worker (Lewis et al. 2015).

For international companies, this issue is even more common. Indeed, many cases of modern construction slaves emerged in the last years, mainly in the Arab States where the estimates of modern slavery are affected by substantial gaps in the available data (Walk Free Foundation 2018). This region hosts more than 17 million migrant workers, many of whom are in the construction industry (95% in construction or domestic work) (International Labour Organization 2019). Recently, many have criticized Qatar and FIFA World Cup 2022 megaproject for its abuse on migrant workers under the Kafala system (Chaudhary 2017, Millward 2017). The Kafala system was first introduced in many Arab States as a noble obligation in the treatment and protection of foreign guests, but is now denounced globally as a mechanism creating dependence between an employer assuming full responsibility over the employee visa and legal status (Khan and Harroff-Tavel 2011). This sponsorship system has been denounced by NGOs, but is still in place in many Arabic states (Human Rights Watch 2019).

Locally or internationally, construction worker abuse has many forms. Companies should assess their recruitment processes, labor sourcing and management programs, and do the same for their third party. Lack of legislation is also an important challenge for construction workers’ conditions.

3 POSITIVE DEVELOPMENTS

3.1 Awareness and Certifications

Governments and consumers must be part of the change. Social and legal pressure will force companies to adopt more sustainable practices (Kim 2017). Many NGOs raise awareness and shine a light on harmful practices. Index and annual reports help companies to assess their activities and take actions (Table 1).

Table 1: Major NGO’s raising awareness and producing data about modern slavery

Organization	Document	Description
Walk Free Foundation (Australia)	Global Slavery Index (Walk Free Foundation 2018)	Complete index with rankings and scores per country. Prevalence, vulnerability and government response to modern slavery are evaluated.

Cato Institute (United States)	Human Freedom Index (Porcnik 2018)	Seventy-nine distinct indicators are used to evaluate countries according to personal and economic freedom.
Anti-slavery (United Kingdom)	Various reports and case studies (Anti-slavery international 2018)	Reports on various forms of slavery. Case studies in different countries and industries.

Independent certification such as Fair Trade (Fairtrade 2019) labels products that were made in decent working conditions and with transparency. However, this system faced criticism by some questioning the real benefits for the vulnerable communities (Jaffee 2015). For now, most of the labeled products are food, goods and clothing. Construction engineering would require raw materials to be certified. This notwithstanding, this kind of certification has the potential to benefit companies via positive marketing and fight slavery.

3.2 Legislation

Many organizations investigated human rights abuses in their activities to align their strategy with the United Nations Guiding principles in the past decade (United Nations 2011). New and more restrictive legislation in the United Kingdom (United Kingdom 2015) and California (State of California 2010) are now forcing them to modify their business models and report annually their actions to fight slavery (Table 2). Canada is expected to follow the trend and pass a Bill about modern slavery in 2020. France and Australia also regulate modern slavery in global supply chains.

Table 2: Key legislation to tackle modern slavery

Legislation	Scope
Bill C-423 to be effective in January 2020 (Canada 2018)	Business with activities in Canada must publish an annual statement including the organization's structure, policies, due diligence, risk and training about modern slavery. Failure to disclose will lead to a maximum fine of 250 000 CAD.
California Transparency in Supply Chains Act (State of California 2010)	Allowing consumers to make better purchasing choices. Must disclose efforts to fight modern slavery. For retail sellers or manufacturers doing business in California with more than 100 000 000 USD in gross receipts.
Principles on Business and Human Rights (United Nations 2011)	Provide principles to enhance standards and practices regarding business and human rights.
UK Modern Slavery Act (United Kingdom 2015)	Business with a global turnover of 36 000 000 EUR or more with activities in the UK must publish an annual statement including the organization's structure, policies, due diligence, risk and training about modern slavery.

3.3 Self-Regulation

With complete and robust international legislation still lacking, some industries develop self-regulation mechanisms. It has been studied that self-regulation is directly related to the level of corporate social responsibility (Dashwood 2014). Also, self-regulation level predicts companies' behavior (Nysten-Haarala, Klyuchnikova, and Helenius 2015). Information disclosure is often used as a regulatory tool to influence business behavior in many industries. Some companies outside of the construction industry voluntarily published their supplier lists. Supply chain transparency can reduce modern slavery and other social issues (Doorey 2011).

4 POSSIBLE TECHNOLOGICAL SOLUTIONS

4.1 Blockchain and the Internet of Things (IoT)

Blockchain has attracted a lot of attention recently, particularly because of the growing popularity of Bitcoin. However, many argued about the independent importance of blockchain technology and claim that it is the most transformative technology since the creation of the World Wide Web (OECD 2018). Blockchain is a decentralized technology expecting to improve trust and reduce fraud, corruption and information falsification (Chow 2018). It has been discussed that the adoption of blockchain may bring supply chain transparency to a new level (Francisco and Swanson 2018) and that blockchain has many favored use cases for provenance tracking (Kim and Laskowski 2018). Assuring the strict environmental control process for transport of pharma and medical products in the supply chain (Bocek et al. 2017) and monitoring food quality along the supply chain (Feng 2017) are some of the blockchain applications studied for the supply chain. Also, Slavefretrade (Slavefretrade 2019) proposes a technology platform using blockchain to assess and certify that company's supply chains are free of modern slavery.

Internet of Things gather information about objects the environment that surround us. It generates enormous amount of data used to improve or assure efficiency in our daily lives (Gubbi et al. 2013). IoT is everywhere and creates great opportunities. Some examples of IoT technology are home automation (thermostats, lights, etc.), healthcare and fitness (smartwatch, personal emergency response systems) and smart cities (traffic congestion, pollution). IoT is also gaining popularity in supply chain management (Abdel-Basset, Manogaran, and Mohamed 2018). Indeed, expected spending growth until 2023 in IoT is estimated at 24,2% for track-and-trace applications and at 20,2% for supply chains (Forrester 2018). Some applications of IoT for supply chain management include real-time tracking (Ng et al. 2015) and managing expiry dates for perishable goods (Heising, Claassen, and Dekker 2017). Despite scalability issues caused by the large volume of data, blockchain and IoT could help managers identify critical points for modern slavery in their supply chain.

4.2 Artificial Intelligence (AI)

Cognitive Computing's goal is to simulate human thought processes in a computerized model (Kelly and Hamm 2013). Starting from an algorithm, computers can learn with the help of scientists and engineers, and eventually detect patterns that humans could never detect. Compared to human, cognitive computing does not need structure data in spreadsheets and it has been estimated that 90% of the data produced is unstructured (Deloitte 2016). Using AI with big data produced by IoT can greatly enhance supply chain management and reveal human rights abuse (Tjahjono et al. 2017). Some applications for AI in supply chains include risk management (Baryannis et al. 2019), logistics and schedule planification (Li et al. 2017, Ivanov et al. 2016). Despite lack of trust and decision transparency, cognitive systems could overcome some of our limitations and facilitate the process of large information volume from company's complex supply chains (Kelly and Hamm 2013).

5 WHAT CAN YOU DO NOW?

With global awareness on modern slavery, many organizations published guides for businesses. Following are few suggested steps and good practice inspired by references setting the standards in this area (CIOB

2016, Elgg 2016, Stronger Together 2019, Walk Free Foundation 2018). Canadian construction engineering companies can adopt these today in anticipation of Bill C-423:

1. **Commit:** Assign responsibility for addressing human rights risks to a group of managers in the company. Once the scope is defined, responsible people should include clauses regarding modern slavery in policy and procedure (code of ethics, procurement, human resources, and recruitment, technical). They should communicate those changes to their third party and suppliers and ensure they have the proper resources to respect them.
2. **Assess:** Map the business supply chains to identify where there are risks of slavery, but also where information is lacking. Compared to data produced by NGO's (Table 1). Combine the assessed risks with the other commercial risks to define priorities and prepare an action plan to monitor those risks.
3. **Implement:** Use the action plan to reduce the risks of modern slavery. Engage relevant stakeholders for higher risks. Mitigate these risks at the supplier level, internally, within the industry and the government (advocate for change).
4. **Remedy:** Provide access to grievance mechanisms allowing workers along the supply chain and the company to be heard. Develop method and processes for victims' remediation.
5. **Monitor:** Track your progress and the efficiency of your due diligence efforts. Establish indicators (number of high-risk suppliers, audit raising non-compliance, compensation expenditure, number of modern slavery training) to assess your program.
6. **Communicate:** Share information about progress and challenges to stakeholders and others among the industry. Increased trust and cooperation will build better practices.

It is recommended to only contract with formal labor providers having legitimate business entities. Those undertaking these tasks should have been trained to recognize and prevent slavery. A legal arrangement should confirm that no recruitment fees were charged to workers. For suppliers, companies should cross-reference with multiple sources. Technologies reporting adverse media coverage and screening social media, news and others should be implemented to monitor suppliers around the globe.

Bill C-423's reporting obligation will affect construction engineering activities. Indeed, companies will have to trace all their manufactured, produced, extracted or processed goods in Canada or elsewhere along with their imported goods, and they will have to report their activities carrying risk of modern slavery and how they intend to assess and manage them. This could reveal breaches and force companies to modify or adapt their supply chains, contractual and hiring process. Reporting must also include policies, measures and training about modern slavery inside the entity. Construction engineering companies will have to provide concrete examples of those annually. They could use toolkits provide by the Chartered Institute of Building (Stronger Together 2019). This organization also offers online training and many insights. Much of the content was created to assist companies affected by the UK Modern Slavery Act (Table 2).

Most of the Canadian construction engineering companies who already took actions to fight modern slavery have activities in the UK and other more restrictive jurisdictions (WSP 2018, SNC-Lavalin 2017, Stantec 2017). Indeed, since they had to comply in 2015, most of their work is done. Ethics & compliance or Integrity departments manage the policies, measures, training and risks regarding modern slavery. These departments have amended contracts and assessment questionnaire, installed integrity/ethic hotline for employees, conducted audits and spot checks and reviewed training periodically. Usually, modern slavery risks are managed with other reputational risks (e.g. conflict of interest, corruption, collusion, etc.).

6 CONCLUSION

Modern slavery effects and destroys millions of lives annually. Construction engineering sector is a fertile ground for modern slavery with its complex supply chains and its volatility. Indeed, each project has numerous supply chains and companies' activities are highly cyclical resulting in various workforce and suppliers. Companies face major challenges to detect and remove slavery from their activities. This notwithstanding, many organizations raise awareness annually by publishing data and uncovering slavery stories across the globe. Very little companies have decided to take actions willingly and governments are slowly implementing legislation regarding this issue. They lead the fight and these laws are the most efficient ways to see changes in the construction sector. With the technological revolution taking place,

companies could facilitate this fight and even access a competitive advantage by strategically using technologies like blockchain, IoT and AI. With Bill C-423 around the corner, Canadian construction engineering companies must be proactive and assess their activities to know the magnitude of the task awaiting them. Many guides and references were created after 2015 and the UK Modern Slavery Act to support companies. Canadian construction engineering companies should draw on their work and adapt it to their realities.

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