

Review of Comparisons of Prevention through Design (PtD) Approaches Between UK vs US Construction Sectors

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Extended Abstract: Mendeloff & Staetsky (2014) reported in 2010, the United Kingdom's (UK) fatality rate for all industries was about 1/3 the US all industries fatality rate and the UK's construction fatality rate was 1/4 the US construction fatality rate. European Union (EU) countries' fatality rates were almost as low as the UK rate. They found the lower rates in EU countries were associated with high-level management attention to safety issues and in-house preparation of "risk assessments". *Why is construction work in the UK (and the EU) safer than in the US?* There are many contributing factors reported in the literature. This paper discusses the Prevention through Design (PtD) initiatives of the UK vs US and their effectiveness in controlling work site injuries and fatalities. The findings can help better understand the PtD challenges and opportunities for the US construction industry, stakeholders and possible safety policy or regulation initiatives, etc.

In 2019, 5,333 fatal work injuries occurred in the US which, on average, is more than 100 a week or about 15 deaths every day (BLS, 2020). About 20% (1,061) of worker fatalities in private industry in calendar year 2019 were in construction – accounting for one in five worker deaths for the year. This was about a 40% increase from 2011 when 761 construction fatalities occurred (Brown et. al., 2021). US federal OSHA's most frequently cited 10 top standard was Fall Protection (29 CFR 1926.501) (OSHA, 2021). US Occupational Safety and Health Administration (OSHA) has identified the "Construction Focus Four" hazards (Falls, Caught-In-or-Between, Struck-By, Electrocution), and has been providing the construction "Focus Four" outreach training lesson plans and programs (OSHA, 2022, nd). However, the all-industry fatality rate in the United Kingdom was about 1/3 the rate in the United States. In construction the rate was about 1/4 the US rate, a difference that had grown substantially since the 1990s. Several other EU members had rates almost as low as the UK rate (Mendeloff & Staetsky 2014).

How can the differences be explained? We have explored possible reasons why the UK's safety and health (fatality rates) are much better (lower) than other countries including the US and we attribute some of the difference to UK's PtD approaches regulations including workplace safety and management practices.

Since the mid-1990s, Prevention through Design (PtD) has become increasingly prevalent in construction. The acceptance of PtD has largely been due to the removal or reduction of risks during the design development and execution phase of construction projects. European States have had the added impetus of national legislation (Aires & Gámez, 2015). Britain has significant rules that do not exist in the U.S., such as the "Construction Design and Management" Regulations (CDM, 2015), which place obligations on designers and architects to include safety in a project's design stage, as well as throughout the construction processes (e.g., planning and risk assessments). For instance, European (UK) regulations require each company

to do a safety and health risk assessment and address those risks. More specifically, CDM (2015) aims to improve safety and health by:

- establishing a sensible work plan so risks are managed from start to finish;
- have the right people for the right job at the right time;
- coordinate all worksite work;
- provide the correct risk information and how they should be managed;
- communicate this effectively to all those involved;
- consult/engage with workers about worksite risks and the mitigation.

This is similar to Federal OSHA's proposed Injury and Illness Prevention Programs (IIPP) but only a few Federally Approved State OSHA programs have developed/adopted their own (IIPP) program (OSHA, 2012).

Britain is more highly unionized than the U.S. but like the US, Britain's all industry unionization rate has fallen from 32.4% in 1995 to 23% in 2019 and is projected to decline to 16.3% by 2050. Unionization in Britain's construction sector was 30.4% in 1995, 11.9% in 2018 and is projected to decline to 3% by 2050 (Mitrefinch, 2021). By contrast, in 1983 20% of US of private sector workers were unionized and by 2021 only 10.3% were unionized (Van Green, 2022). Unionization among US workers has declined from 20.1% in 1983; 18% in 2000 to 12.6% in 2021 (Phillips, 2002).

The construction workforce in Britain is claimed to be more stable, more experienced and less risk taking. Britain has tougher fall protection rules than those in the U.S. where falls account for a large percentage of construction fatalities. Government-funded construction, which may be safer and may more closely follow safety regulations, is a larger share of construction in Britain than in the U.S. For example, the 2012 construction of London's Olympic Park was one of Britain's safest projects (Schneider, 2014).

Oyegoke (2001) studied similarities and differences between the American and British Construction Management systems including the distribution of responsibilities and risks in both the pre-construction and during the construction stages. The main provision of Britain's Health and Safety at Work Act (HSW Act – 2015) states employers have the legal responsibility for the safety and health of their employees and others but most of their duties are expressed as goals or targets which are to be met "so far as is reasonably practical" or through exercising "adequate control" or taking "appropriate/reasonable" steps (HSE-49 2013). ConocoPhillips - Canada (2020) provides an extensive 23 page "Exhibit" on how a large contractor planned to meet the HSE Contractor Requirements.

The Occupational Safety and Health Act of 1970 (OSHA 1970) states "To assure safe and healthful working conditions for working men and women; by authorizing enforcement of the standards developed under the Act; ...". The authors believe this may be another reason for the difference in injury and fatality rates between the UK and US, namely UK's regulations focus is on safety and health performance at worksites whereas US regulations focus on enforcement of very specific such as Construction's "Focus Four" program and legally definable/enforceable regulations. For example, OSHA's 29 CFR 1926 - Construction Industry Regulations & Standards has 29 subparts and hundreds of subparts. Another, contributing factor may be since OSHA's promulgation in 1970, very few "consensus standards" such as American National Standard Institute (ANSI) A10 Construction Standards have been "incorporated by reference" (OSHA, 2013).

Although work fatality rates have declined in the US, fatality rates are much lower and have declined faster in recent years in the UK. Efforts to find out the reasons for the much better UK outcomes could be productive. This paper can provide some great insight into some of the difference between what is happening in the UK and the US on some of these issues, and potential industry specific guidance (e.g., PtD in "Focus Four" hazards) to help narrow the disparity between UK's and US's construction fatality rates. This is a very important and complex topic with multi-factorial causes. Identifying and verifying them are challenging but also rewarding. We believe that the more we understand about what is working in the UK it can only help us with US construction occupational safety and health (OSH) and systems engineering & management professionals.

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