

Task 02/A1.1

NATIONAL STATICAL DATA RELATED TO ACCIDENTS IN THE CONSTRUCTION AND FACTORIES SECTOR FOR EACH PARTICIPATING COUNTRY - UK



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1. INTRODUCTION

In this Intellectual Output (O2), the key scenarios/situations for developing 3D virtual safety training environments for the Safecrobot project will be determined. As indicated in the aims of the project the key situations will be based on previous reports, taking into account the most widely used robotics and automation equipment in the construction. The report will outline the main risk scenarios/situations in robotic construction and automation of construction tasks as well as outline the health and environmental prevention measures required.

This will be reviewed by all partners who will comment on any addition or changes that are required especially in relation to their respective countries.

The main objective of this report of the subtask O2/A1.2 is to develop a comparative study of reported accident statistics on constructions sites and factories using robotised or automated equipment in each participant country, in order to define the main risk situations to be implemented in the SafeCRobot learning tool.

1.1 Definition of Robotics and Automation in Construction

For the purposes of this Project the following definition of robotics and Automation shall be adopted. A robot is a machine or piece of equipment designed to execute one or more of construction tasks automatically or semi-automatically with speed and precision either in collaboration with a human worker or completely autonomously. Automation refers to the use of autonomous and semi-autonomous machines on Construction sites.

In the context of this focus shall be given to Construction Operations which involves both human workers and the autonomous and semi-autonomous equipment as defined above.

2. INFORMATION COLLECTED

In the UK, the construction sector is broadly classified into three groups *a)* construction of buildings which includes general construction of a building including new work, repair additions or alterations, *b)* Civil engineering which includes road and railway construction and utility projects, *c)* specialised construction activity which covers trades that specialise in one aspect such as demolition, plumbing, joinery, plastering work etc. The construction sector in the UK accounts for 7% of the total workforce in the UK. The below sections provide a profile of workplace health and safety in the UK construction sector and manufacturing sector.

2.1. Accident statistics in Manufacturing

In the UK, 85,000 workers in the manufacturing sector suffered from work related ill health which are either new or long-standing during the year 2019-2020 out of which 41% are musculoskeletal disorders equating to 34,000 workers.

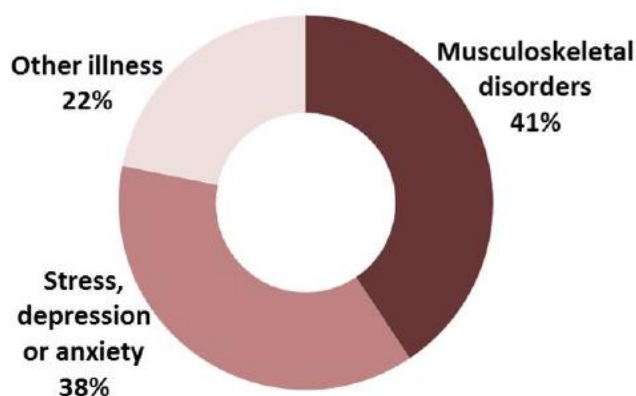


Figure 1: Key Statistics in the Manufacturing Sector in Great Britain, 2020

Further breakdown indicates that fall from height contributes 15% of total fatal injuries and 66,000 workers sustained non-fatal injuries out of which 23% of non-fatal injuries are caused by slip, trip or fall on the same level.

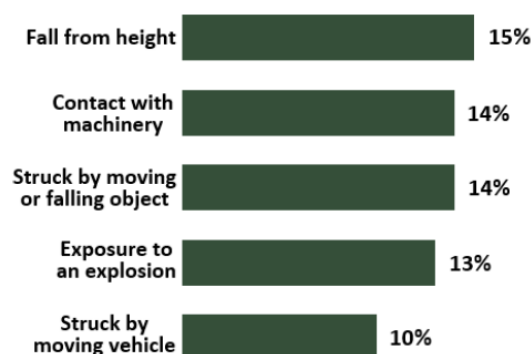


Figure 2: Fatal Injuries

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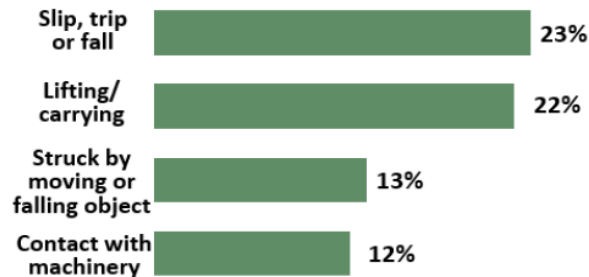


Figure 3: Non-Fatal Injuries

Reports suggest that around 2.8% of workers from the manufacturing sector in the UK suffered from work-related ill health out of which 1.1% of workers in manufacturing suffered from work-related musculoskeletal disorders.

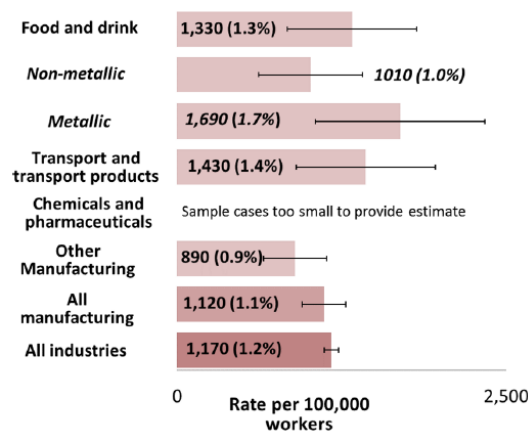


Figure 4: Comparing rates of musculoskeletal disorders in Manufacturing

Further, in the manufacturing sector during the year 2020 4000 workers suffered from breathing or lung problems which is equivalent to .014% of workers in this sector. In 2019-2020, 155 fatal injuries were reported in the manufacturing sector out of which 15% of deaths were due to fall from height, 14% were due to contact with moving machinery and 14% are stuck by a moving or falling object.

The total economic cost due to these workplace injuries was £1.2 billion for the year 2019 which accounts 7% of the total cost across all industry.

2.2. Accident statistics in construction site

Health and Safety Executive reports 81,000 construction workers in the UK has suffered from a work-related illness that is new or long-standing out of which 57% were musculoskeletal disorder.

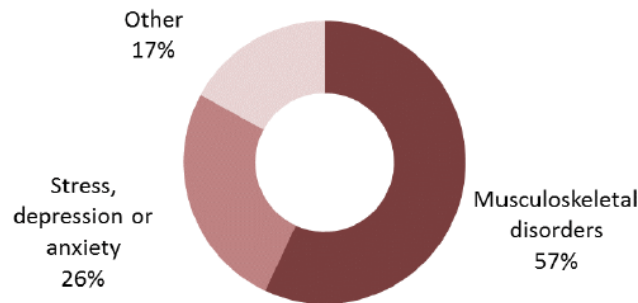


Figure 5: Key Statistics in the construction sector in Great Britain, 2020

While comparing the construction sector to other industries with similar work activity, around 3.5% of workers suffered from work-related ill-health (fig. 6) which is not statistically significantly different to that for worker across all other industry.



Figure 6: Construction compared to industries with similar work activities

Similarly, in the construction sector, an estimated 46,000 work-related causes of musculoskeletal disorders were reported in the year 2020, which is a little less than 60% of all ill-health in this sector. While compared to other industries, the construction sector accounts for the highest number (2%) of reported suffering from musculoskeletal disorders which is statistically significantly higher than the rates for workers across all other industries (1.1%). In the construction sector, 40 fatal injuries to workers and 4 to members of the public were reported during the year 2019-2020. When compared to other industries, the construction industry contributes almost 4 times of fatal injury rate.

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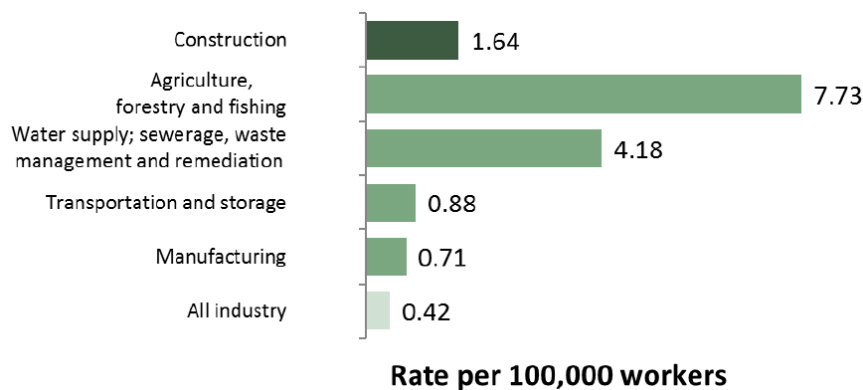


Figure 7: Fatal Injuries in Construction compared to industries with similar work activities

Further classification of accident kinds for the top five causes of fatal injuries suggests that fall from height contributes 47% of the top five causes of fatal injuries (fig. 7). Similarly, in the case of non-fatal injuries, fall on the same level or slips were accounted as the topmost causes for injuries both in construction as well as other industries (fig. 5) which accounts for 61,000 injuries to workers each year resulting in 27% of sick leave over seven days.

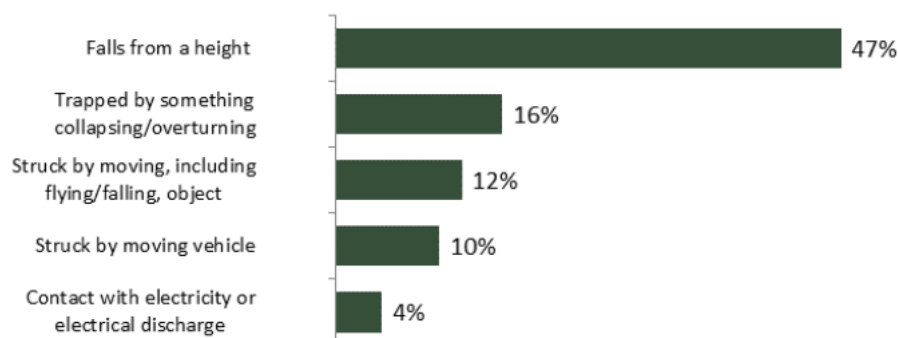


Figure 8: Accident kinds for the top five causes of fatal injuries.

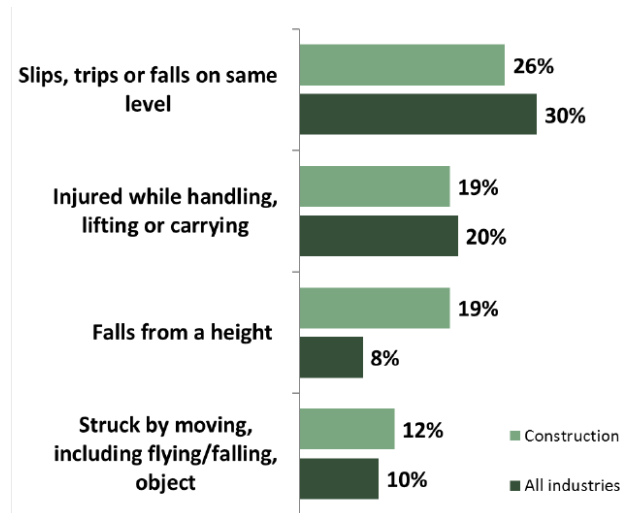


Figure 9: Non-fatal injuries in construction compared to other Industries

These workplace injuries and new cases of work-related ill health in the UK construction is exerting a huge economic burden which estimates a total cost of £1.2 billion in 2019 which accounts for 8% of the total cost across all industries. Further, around 2.1 million working days were lost between 2019-2020 due to workplace injury (25%) and work-related illness(75%).

3. CONCLUSIONS OF COMPILED DATA

The construction industry is one of the most hazardous industries in the UK. Fatal injury rates are over four times the national average (HSE, 2018). Apart from the pain and suffering caused, these accidents and fatalities pose a considerable amount of economic burden to society. Estimates indicate that in the UK alone, the annual cost of the injuries exceeds 1.2 billion which accounts for 8% of the total cost across all industries as well as a loss of 2 million working days (HSE, 2019). Reports suggests that 57% of the work-related in the UK construction sector is from the Musculoskeletal disorders leading from occupational hazards like falls from height (47%).

When compared to other manufacturing industries across UK, construction industry alone accounts for almost 81,000 work-related illness while the whole manufacturing industry accounts for 85,000 work-related illness. This alarming number of work-related illness could be attributed to the type of work environment which poses sever threats and safety issues to the works. Thus, construction workers are more likely to face a number of challenges such as sever weather conditions as well as safety issues such as

working from height or being stuck by objects which poses severe occupational injuries among the works.

Thus, there is a pressing need to introduce robotics and smarter machines which could replace human workers for tasks which are challenging and risky as well as those which does not add value. The application of robots in the taking over such tasks are not new. Such initiatives has been in use since the industrial revolution-4 such as that in manufacturing sector, however, the application of such smart machines becomes challenging in construction due to the nature of the work place where human and robot has to work collaboratively and share same work-space.