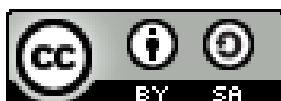


Task 02/A1.1

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



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1. INTRODUCTION

In this Intellectual Output 2, the key situations will be proposed to be included in the 3D environments. As we have indicated in the aims of the work package the key situations will be based on previous reports, taking into account the main risk situations in robotic construction companies and the application of health and environmental prevention measures currently applied in this sector. These situations will be sent to all partners who will comment any addition or change that should be done.

The main objective of this report of the subtask O2/A1.1 is to develop a comparative study in 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.

2. INFORMATION COLLECTED

2.1. Accident statistics in factories

Number of industrial robots in Germany 2020: 26723

A total of **169** accidents with industrial robots (2018)

For comparison: There were 35,732 occupational accidents were caused on stationary machines.

2.2. Accident statistics in construction site

According to BG Bau, the use of robots on construction sites is so low that no specific accident statistics are available (unlike in the construction industry for the prefabrication of building elements)

3. CONCLUSIONS OF COMPILED DATA

The research clearly shows that the greatest danger in human-robot collaboration comes from humans. The causes are improper use, manipulation or disregard for safety devices. In these cases, the risk of accidents is very high due to unexpected movements of the robot at high speed and with great force. In addition, the often sharp edges, the hard, undamped materials, as well as exposed shafts and joints play a role in robot accidents. Other hazards arise from electric shock and handling thermal and/or chemical materials (coolant, lubricants). Secondary hazards such as dust and smoke emission, laser scanning, etc. must also be taken into account.

Conclusion. The focus of the game should definitely be on the correct behaviour of people when dealing with robots.

Additions to the previous remarks

2.1. Accident statistics in Germany, all trades (Source: de.statista.com)

Number of full-time employees (2019): 41.560.982

Number of enterprises/companies: 3.953.076

Hours worked in 1,000: 64.419.566 h

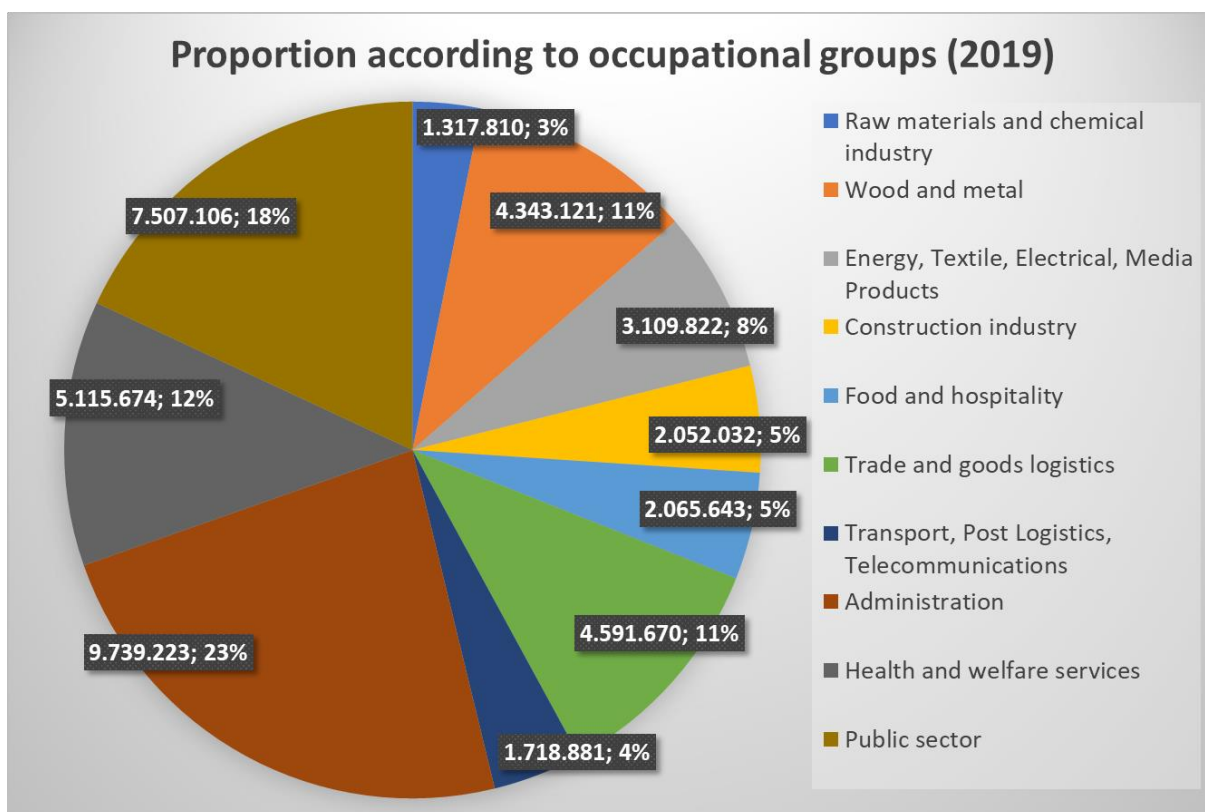
Number of occupational accidents reported in Germany (2019): 871.369

Preliminary number of occupational accidents reported in Germany (2020): 760.369

Number of occupational accidents resulting in fatalities in Germany (2019): 497

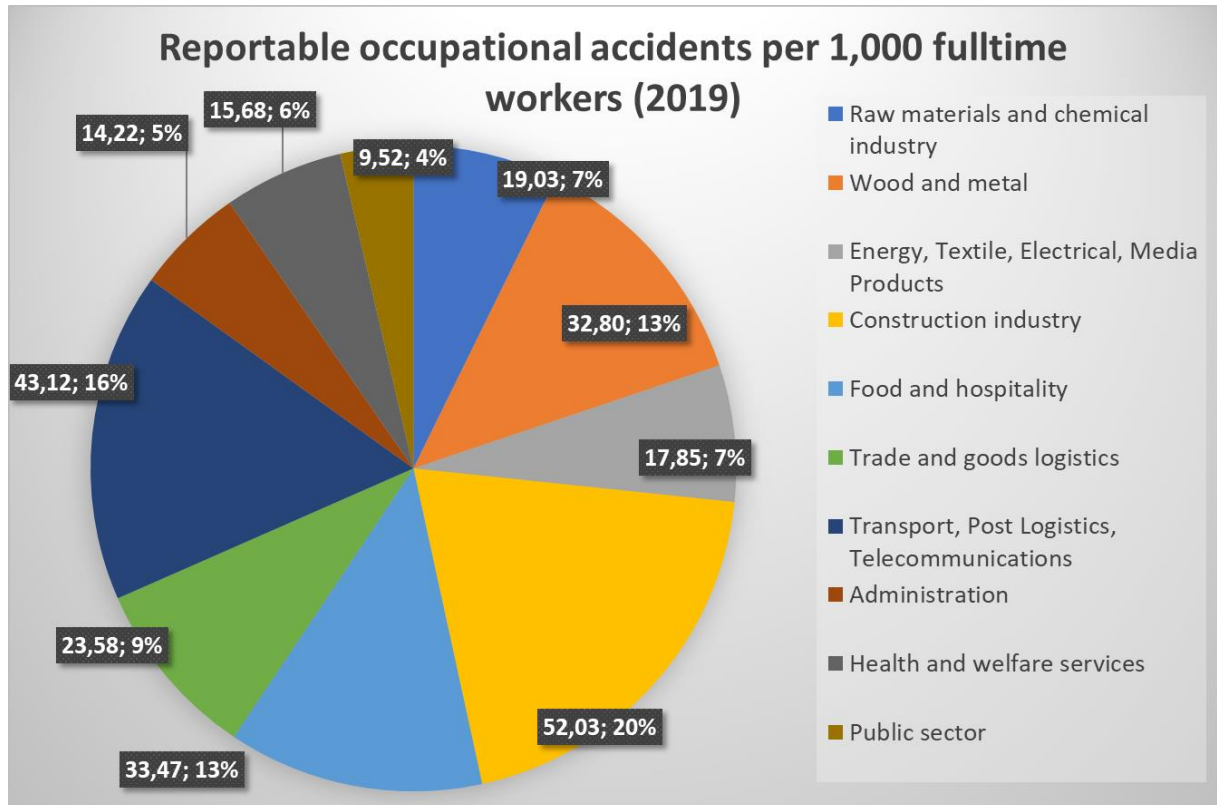
Preliminary number of occupational accidents resulting in fatalities in Germany (2020): 397

Fig. 1: Full-time employees according to occupational groups



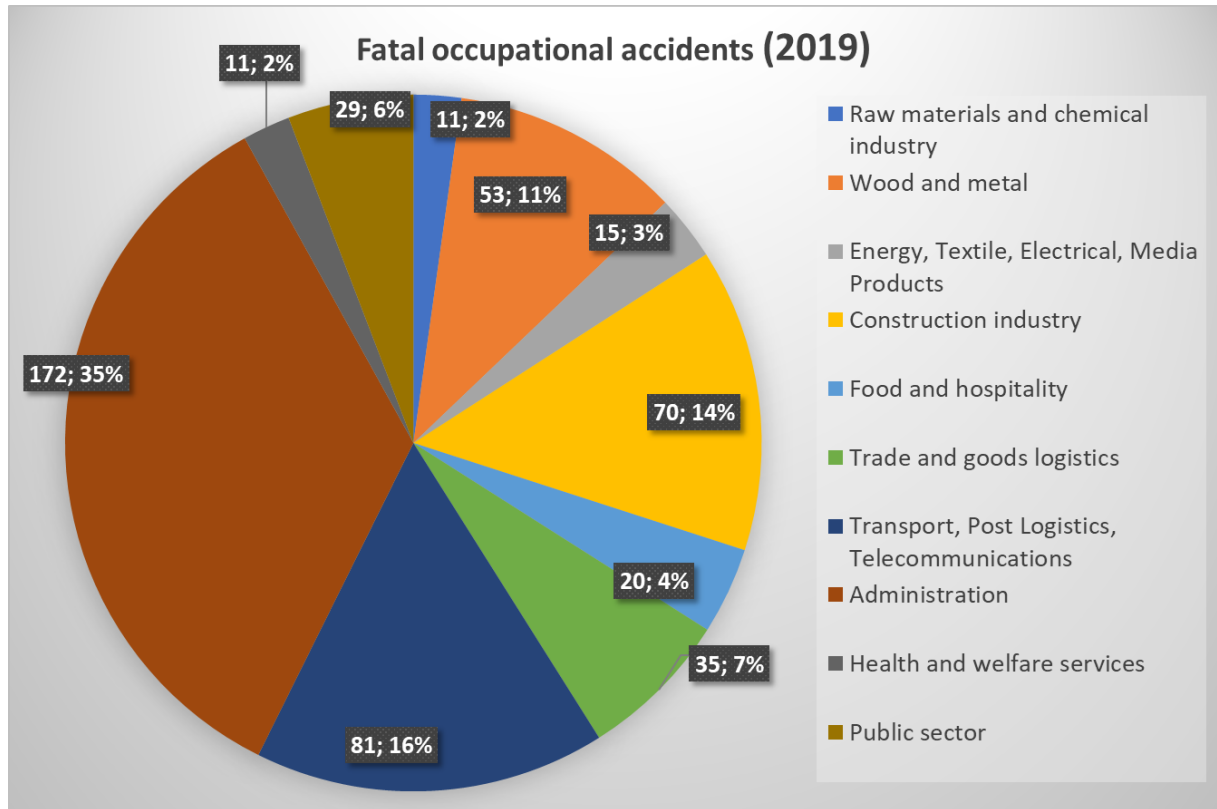
NOTE: Insured employees in the construction industry (2019): 2.052.032

Fig. 2: Reportable occupational accidents per 1,000 fulltime workers (2019)



20% of all occupational accidents occur in the construction industry, although only about 5% of all employees work in the construction industry.

Fig. 3: Fatal occupational accidents



The top 10 occupational accidents in the skilled crafts sector (technical and non-technical causes)

1. Falling down stairs is most common
2. Slipping on slippery floors or tripping
3. Incorrect operation of machines
4. Lifting or storing objects incorrectly
5. Disregarding safety regulations
6. Lack of experience of employees
7. Lack of hazard awareness due to routine
8. Fatalities from falls in construction (40% of fatalities occur in construction trade)
9. Injuries due to falls from scaffolding
10. Safety awareness is often not well developed

Fig. 4: Construction site accidents by working environment

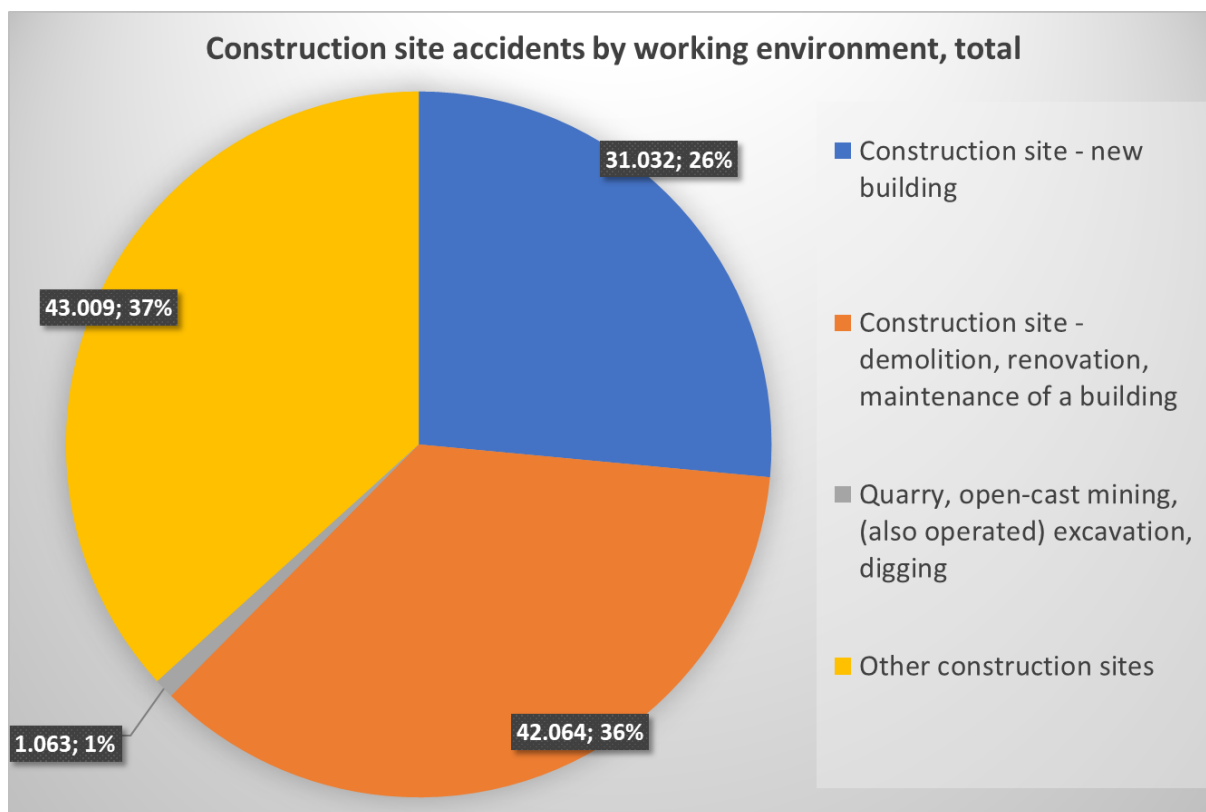


Fig. 5: Preliminary accident numbers on construction sites by sector (2020), per 10,000 employees

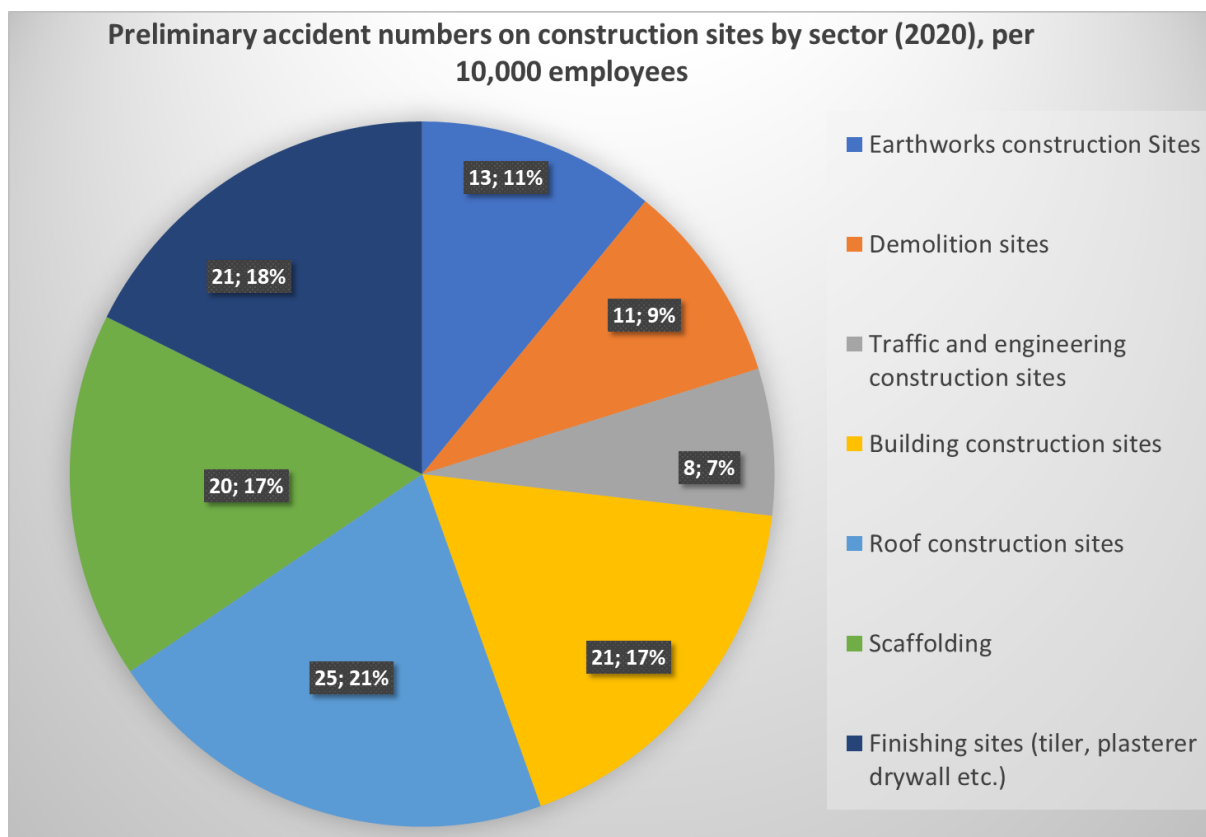


Fig. 6: Construction site accidents following contact that injured the victim

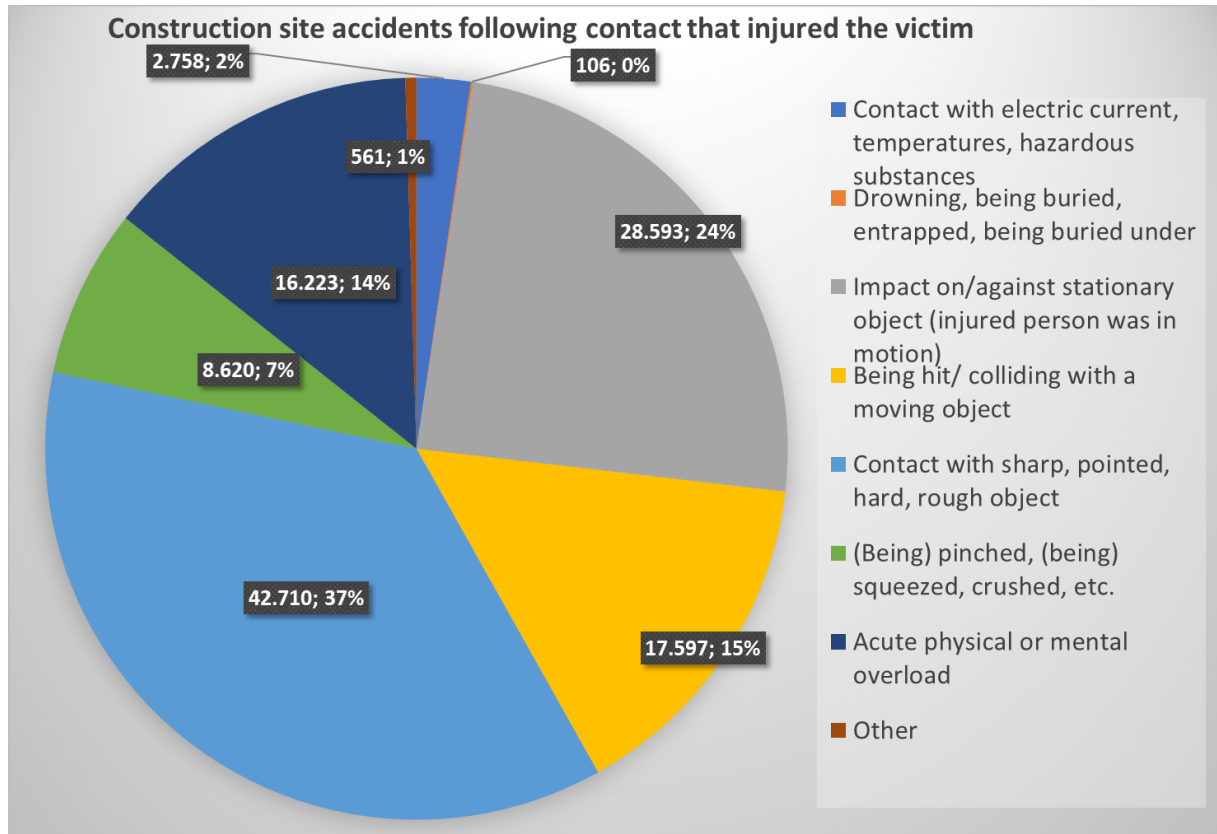


Fig. 7: Structure of occupational accidents according to injured body parts

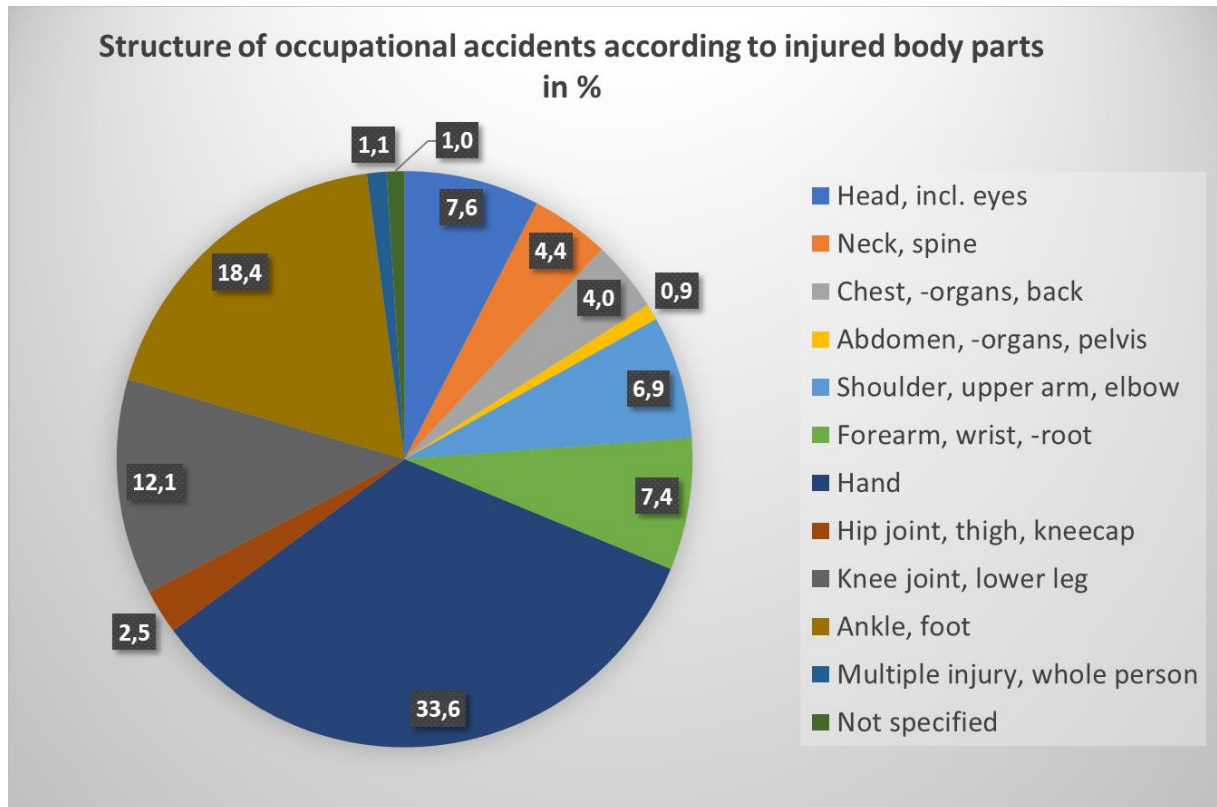


Fig. 8: Structure of occupational accidents according by type of injury

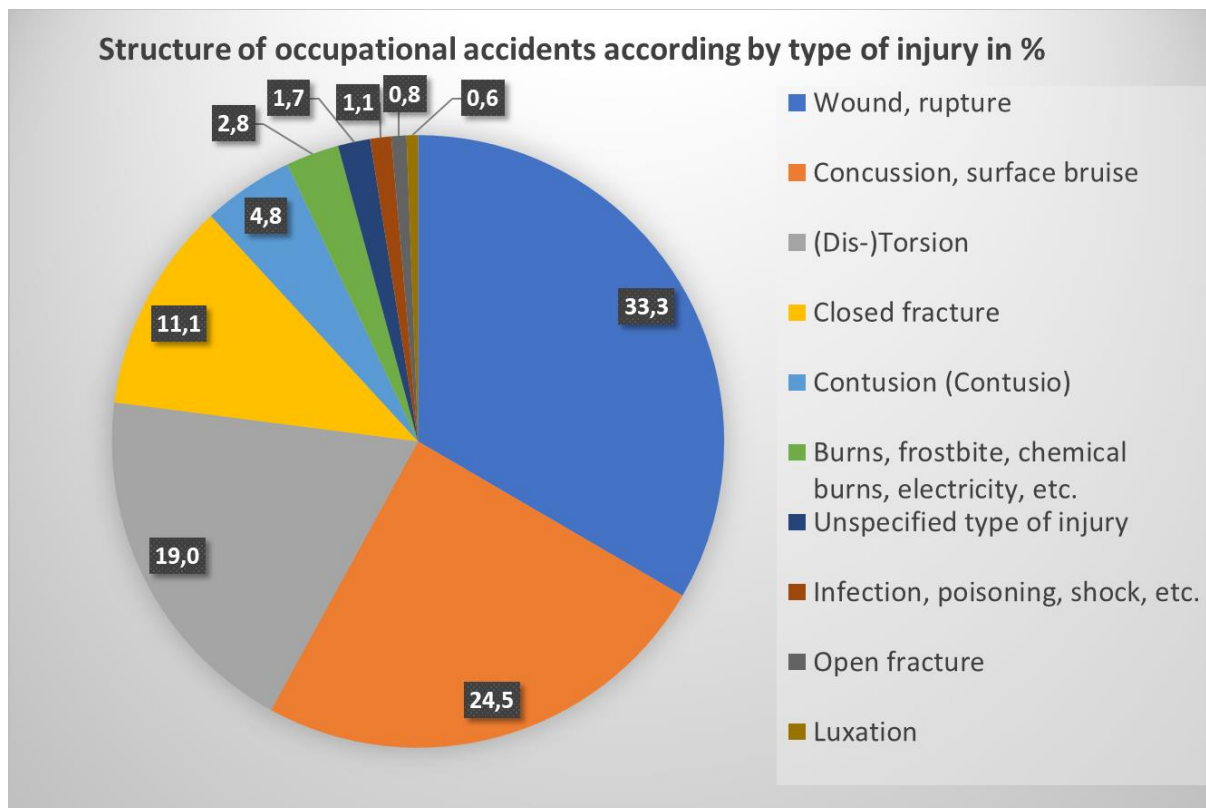


Fig. 9: Preliminary occupational accidents when handling machinery and equipment on construction site, per 10,000 employees (2020)

