THE BIG International Building & Construction Show

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DUBAI WORLD TRADE CENTRE

Use of Robots in Construction Industry – A Scenario Based Perspective

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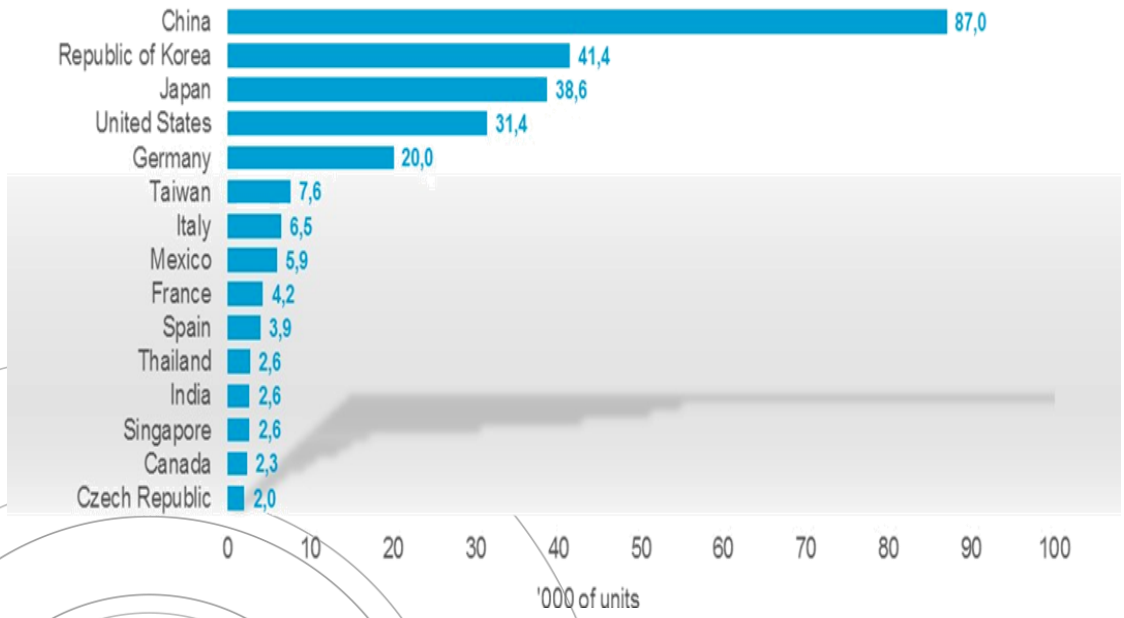
Introduction

- Constant growth has allowed robots to start establishing their presence in a number of different domains of human activity
- The construction industry is a labor-intensive industry
- Construction industry has embraced robotic technology, however, presently it is one of the least automated industries of all
- Use of robots can be a big game-changer for the industry given the fact that they will contribute to automate numerous tasks
- Robotics advances construction industry automation to enable safer and sustainable buildings

Global Picture



- This year, robot installations skyrocketed to a new record level of 517,385 units. This represented a growth rate of 31%
- 74% of all newly deployed robots were installed in Asia
- Every other robot globally installed in 2021 ended up in China
- Five major markets for industrial robots are China, Japan, the United States, the Republic of Korea, and Germany. These countries accounted for 78% of global robot installations

China alone has 52% of total global robot installation

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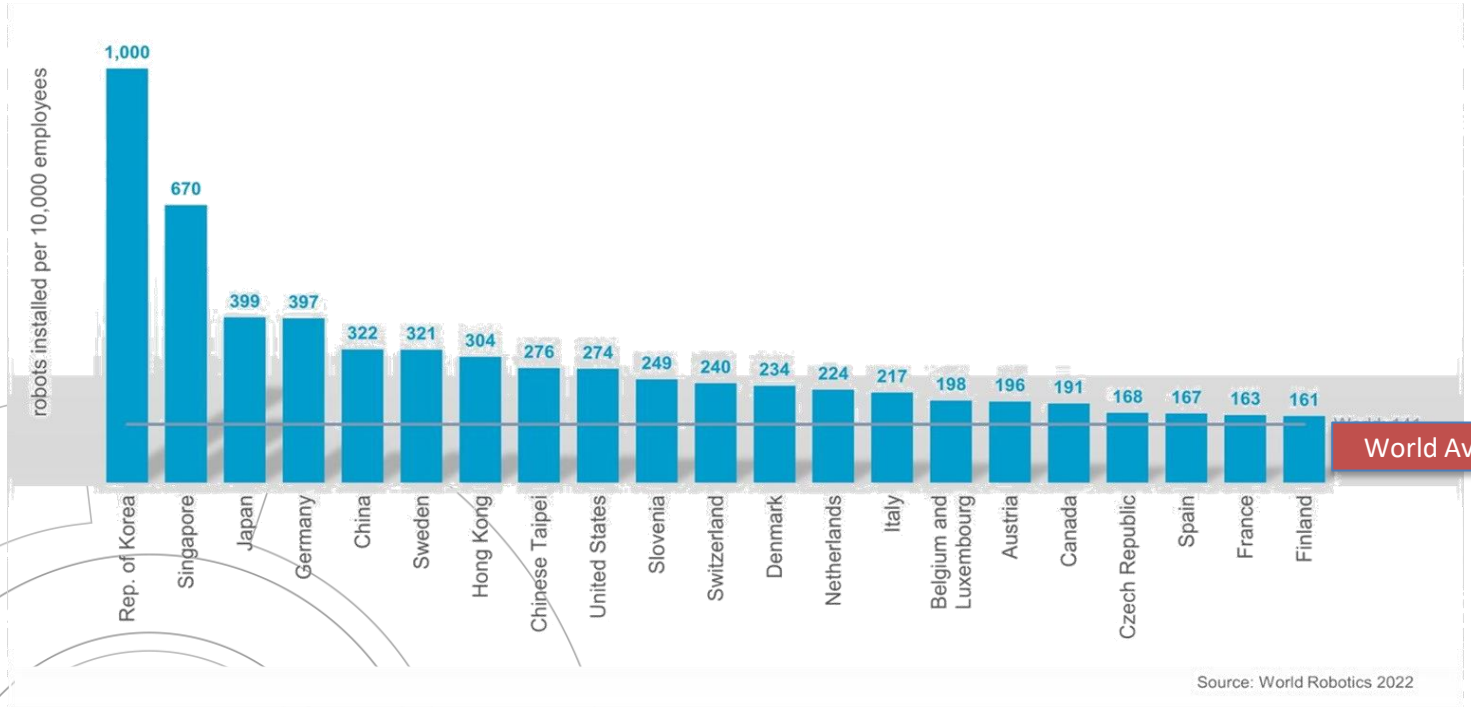
Robot Density



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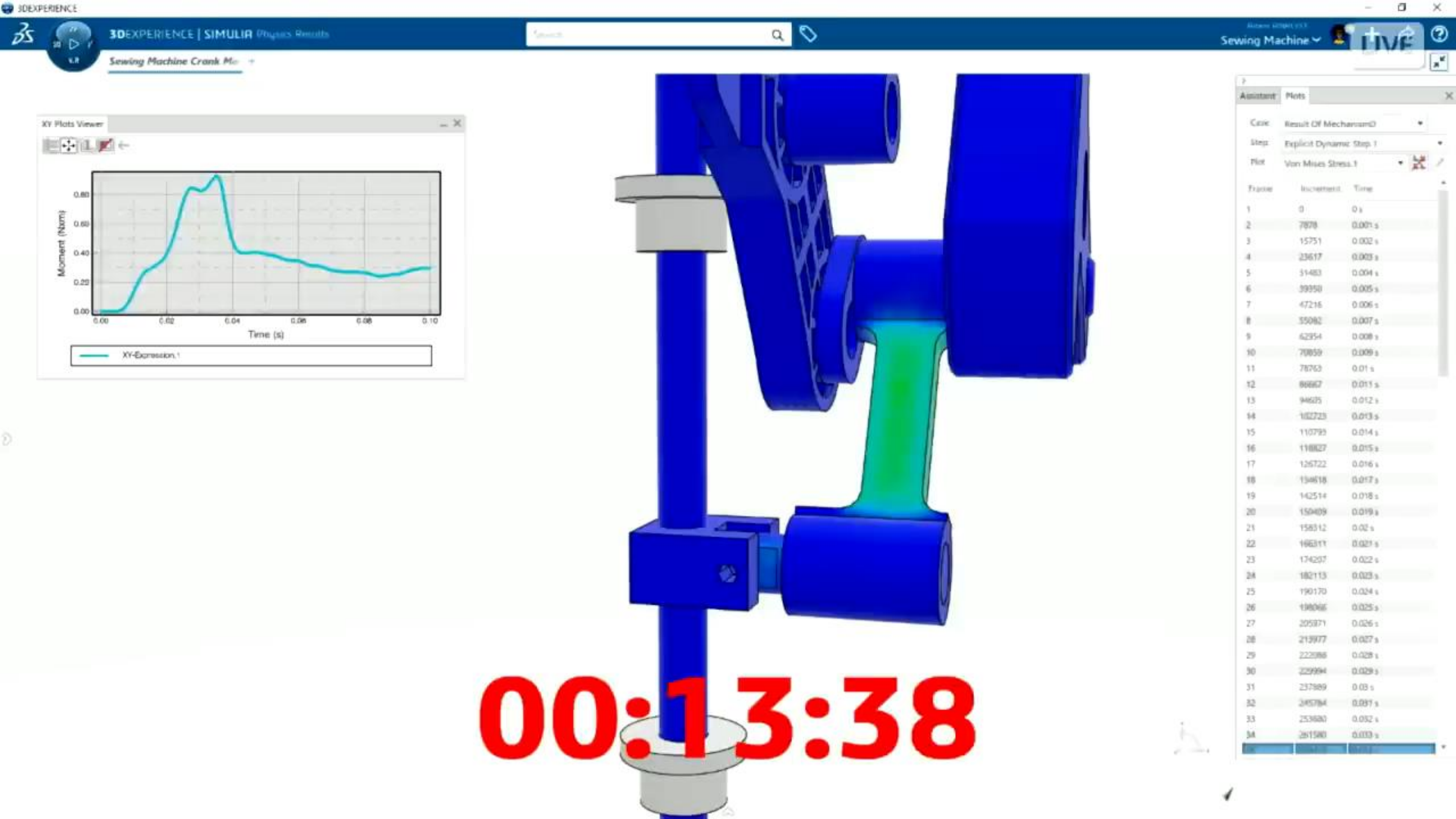
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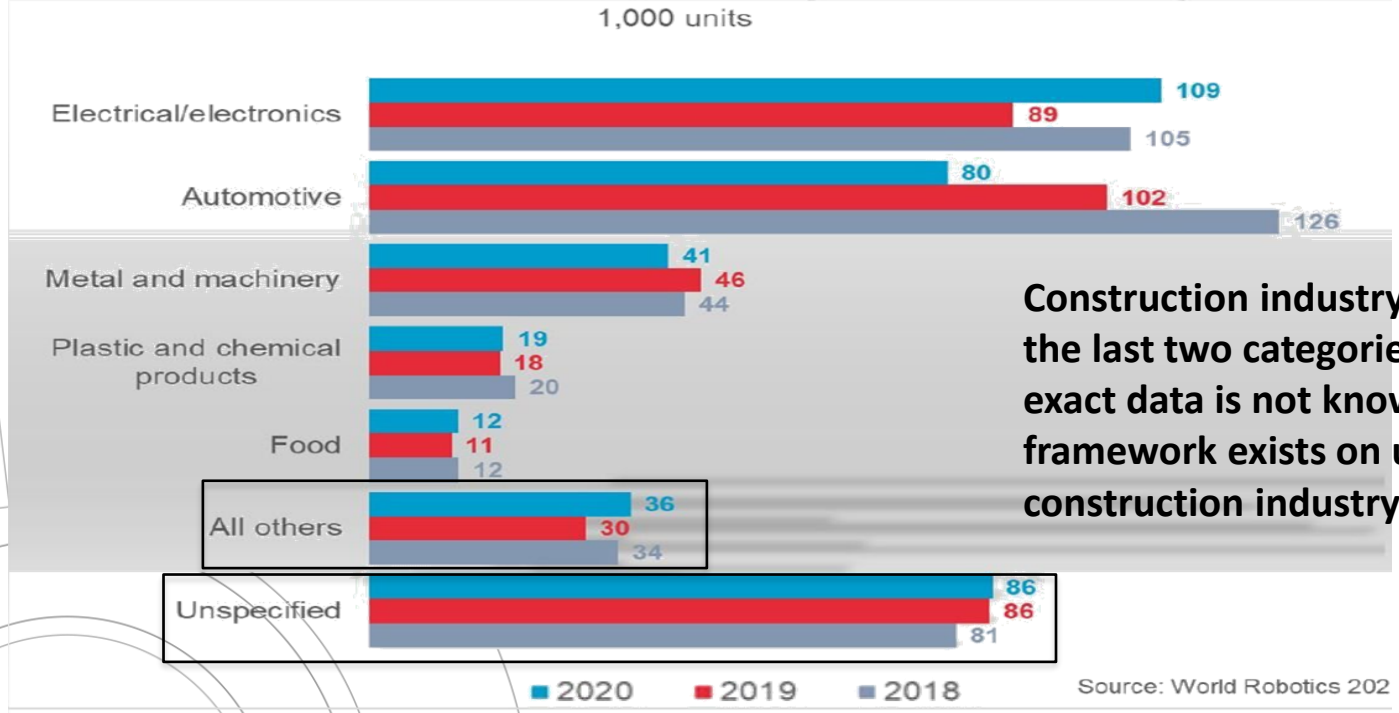
Use of Robots by Industries



Construction industry is included in the last two categories, however, exact data is not known as no framework exists on use of robots in construction industry (Source: IFR)

Scenarios in Construction Industry

Existing

- Human solo (HS)
- Only human labour work
- Robot is neither substitute nor complement

Advanced

- Robot solo (RS)
- Only robots work
- Robot is substitute of human labour

Articulated

- Human and robots mix (HRM)
- Both human and robots work
- Robot is complement

Resources and Time

- According to an Associated General Contractors of America report, nearly 70 % of construction firms are having trouble filling necessary roles like carpenters, masons electricians and other forms of skilled labor. The result is that time to completion on these construction projects is reaching a 15% high
- One solution construction industry is turning to is robotics
- Robots are not standard at construction sites yet, it could soon become commonplace
- By using advancements like drones, automation and construction robots, construction managers can significantly increase efficiency and safety at construction sites and help compensate for the job gap

The Hadrian X Self Bricklaying Robot Is The Future Of Modern Day Smart and Safe Construction - YouTube

Benefits of Using Robots in Construction Industry

Talks Technology

THE BIG 5

- Cost reduction
- Waste reduction
- Increased safety
- Increased efficiency
- Quality

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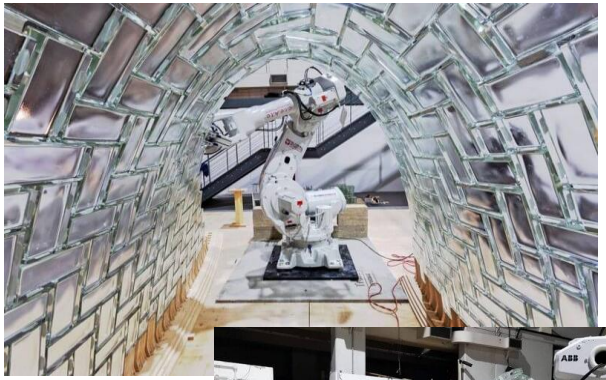
Robotics in Construction Industry

- 3D Printing
- Drones and site characterization machines
- Working Machines (brick laying, demolition, assembling, self driven plant, fixing of material)
- Automation



[Masonry Construction Robot laying Bricks on a construction site - YouTube]

Filling of Gap

- According to the 2020 report by Phillips, as many as 2.7 million (49%) of all construction positions could be replaced with machines by 2057
- Specifically, this report found there is automation potential of about 42% for electricians, 50% for plumbers, 50% for carpenters, and 88% for operating engineers

[Automated Brick Laying Robot - YouTube]

Conclusion and Policy Recommendations

- As of now there is no exact framework/ strategy for use of robots in construction industry - IFR (International Federation of Robotics)
- Construction industry is the largest industry at the global level and has huge potential for use of robots and automation
- Comprehensive frame work and implementation strategy for use of robots in construction industry needs to be developed

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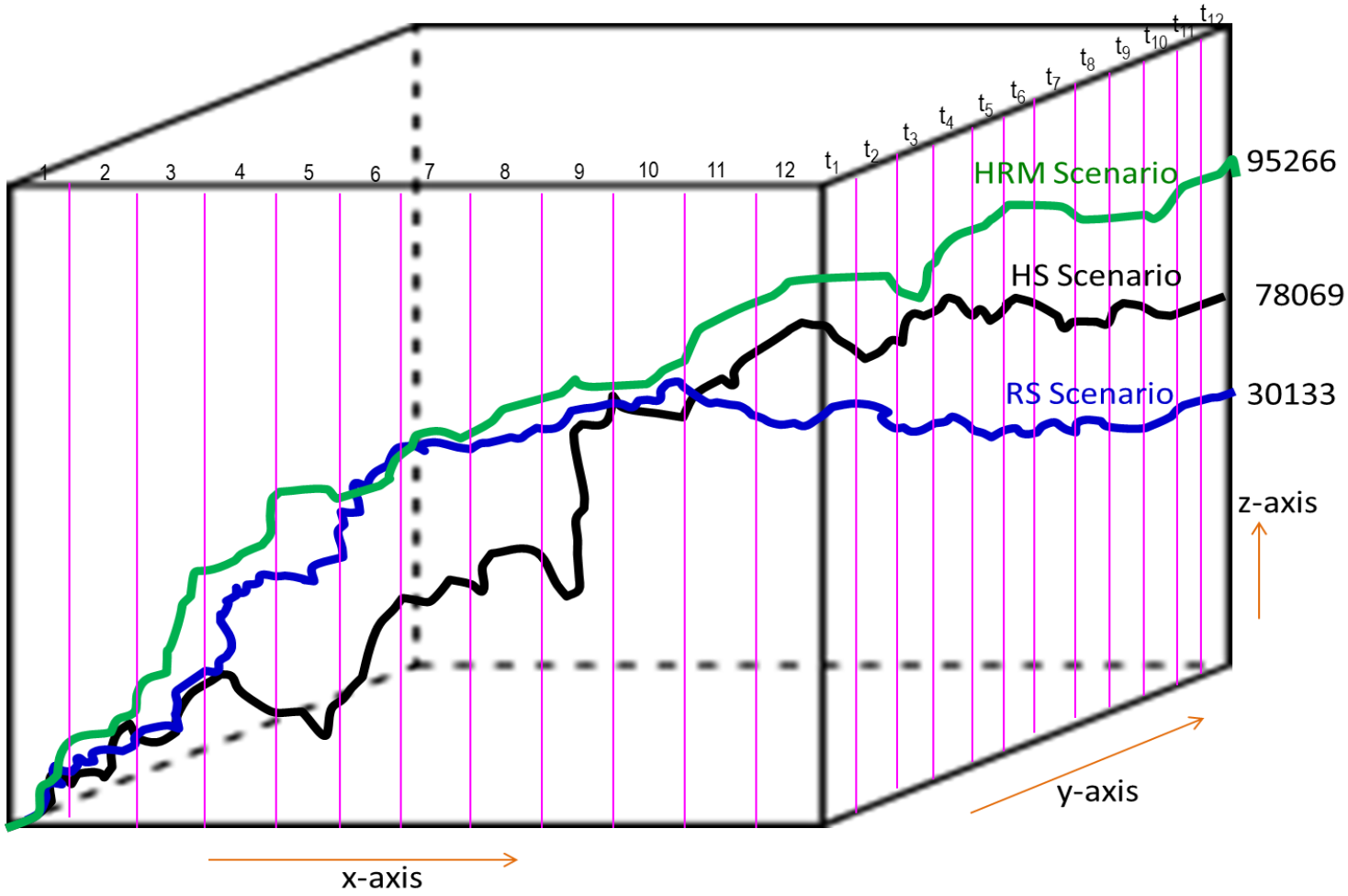
Technology
Talks
Urban Design & Landscape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