COVID-19 & THE CONSTRUCTION INDUSTRY

WHAT HAS HAPPENED SO FAR AND WHAT WE CAN LEARN FROM IT

INTRODUCTION

For more than a decade, we have seen how digital technologies have transformed and completely taken over many industries. The construction industry has not yet seen quite as drastic a change as, for example, the entertainment or the music industry. However, slowly but steadily we are seeing new technologies emerge which have started driving the change of how infrastructure, real estate and other built assets are designed, constructed, operated, and maintained. Those technologies include building information modeling (BIM), prefabrication, wireless sensors, automated & robotic equipment, real scale 3D printing and virtual / augmented reality.

Image 1: The E&C industry worldwide.
Source: Own illustration based on World Economic Forum facts

In the midst of a global pandemic, which has sent most of us to a remote work modality, the construction industry is sensing the pressure to change its business models and integrate the use of digital tools.

According to the World Economic Forum, prior to the outbreak of COVID-19, a growth of the global construction industry was foreseen. Even though the impact of COVID-19 on the E&C (Engineering & Construction) sector is not yet quantifiable, it is clear that no industry is immune to the global crisis caused by this virus.

GLOBAL COVID-19 EFFECTS ON THE CONSTRUCTION INDUSTRY

Throughout 2020 we have seen how almost every country has declared a state of emergency and with it, the suspension of all non-essential businesses for a period of time. That said, the effect on the construction industry will vary in the different regions around the globe. While the United States will see mass layoffs in the construction sector and building activity, in southern Europe, it is anticipated to decrease by up to 70%[1]. On the other hand, China's economy, including the construction sector, is already largely back on track[2].

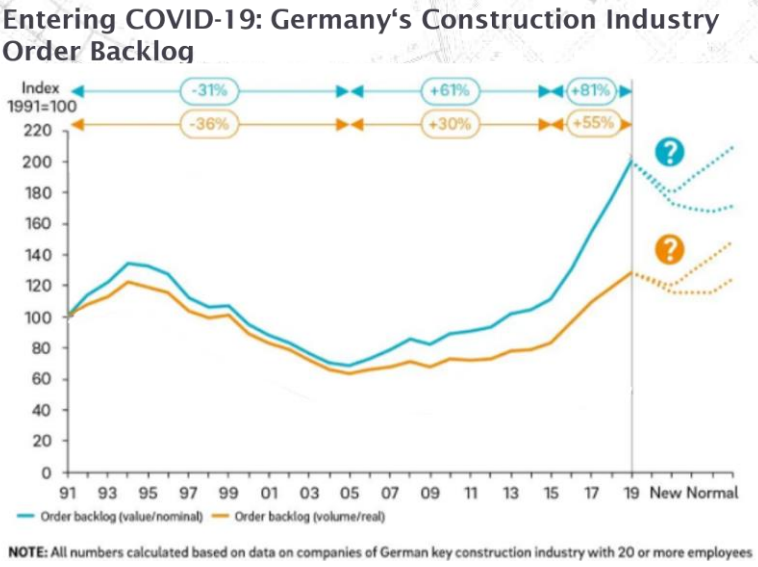

Image 2: Germany's Construction Industry Order Backlog,
Source: Roland Berger, Statistisches Bundesamt 2020

Germany is known to be one of the countries that has best dealt with the COVID-19 outbreak. Taking a closer look at Germany's construction industry, Image 2 shows how this industry has been visibly growing over the last 15 years up to the moment when COVID-19 hit.

[1] https://www.rolandberger.com/en/Point-of-View/The-coronavirus-crisis-will-cause-significant-delays-to-the-construction.html
[2] https://www.nytimes.com/2020/07/30/business/china-economy-infrastructure.html

Image 3 depicts the development of the European Union (EU) construction production in 2020. As expected, we first see it plummet from February to April, decreasing by 25%. However, after most of the countries started reopening, we see that between April and June, the construction production actually increased again. The improvement of the EU's construction industry gives hope to the same industry in developing countries.

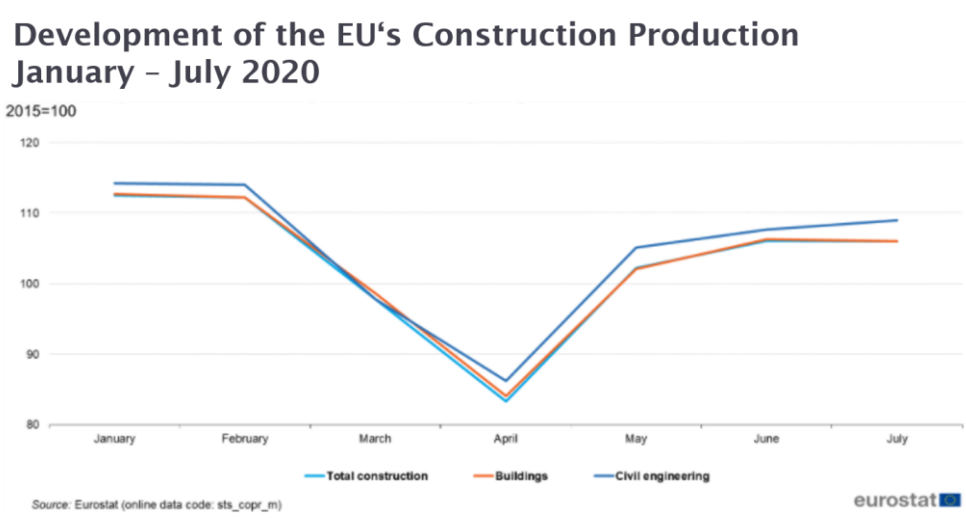

Image 3: Development of the EU's Construction Production
Source: Eurostat

HEALTHCARE AND INFRASTRUCTURE NEEDS IN TIMES OF COVID-19

According to the World Health Organization, one of the main pillars of effectively fighting the current pandemic resides in a well-prepared healthcare industry. This industry was suddenly under enormous pressure to cope with an increased demand for emergency units, ventilators, PPE equipment, and space to treat COVID-19 patients.

Under normal circumstances, hospitals operate at near-surge capacity[3], which means that even a slight rise in patients can overwhelm a hospital beyond its functional reserve. The rapidly evolving outbreak requires all hospitals to be able to adapt to a swift increase in demand while continuing to ensure safe environments for health workers.[4]

Governments' short-term responses around the globe varied from building completely new hospitals exclusively for COVID-19 patients, to turning existing spaces into alternate care sites.

How China built a hospital in less than 10 days

We saw how China was able to build a hospital in under 10 days[5], attributable to a mix of key factors such as the use of a successful construction strategy, the use of modular and prefabricated materials and the lessons learnt from previously built emergency hospitals. 7,500 workers toiling around the clock in three shifts made use of dozens of cranes, bulldozers and heavy machinery on the ground to build the approx. 34,000 m^2 hospital. The design and execution were based on the country's hospital built in Beijing back in 2003 to fight the SARS outbreak and includes a special ventilation system.

Huoshenshan hospital facts:

- **Area** 34,000 m^2
- **Floors**: 2
- **Beds**: 1,000
- **Intensive Care Units**: 30
- **On-site construction**: 10 days
- **Construction workers**: 7,500
- **Design**: based on Beijing's hospital built in 2003 for SARS outbreak

Image 4: Huoshenshan hospital facts
Source: Own illustration

It can be said that building this emergency hospital mostly consisted of the assembly of the modular and prefabricated solutions rather than on-site construction.

[3] surge capacity: the ability of a hospital to expand beyond its normal capacity and to meet an increased demand for clinical care
[4] https://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/4/who-checklist-to-ensure-hospitals-in-european-region-are-ready-for-covid-19-patients
[5] https://www.wsj.com/articles/how-china-can-build-a-coronavirus-hospital-in-10-days-11580397751

Germany's mid- and long-term strategy for hospitals

One of Germany's early responses, as well as that of the UK and other European countries, was to adapt existing facilities to be able to treat COVID-19 patients exclusively.

Germany goes one step further, and in September 2020, its Government approved up to €4.3 billion for the "modernization of hospitals". This focuses on emergency response capacities (spaces & equipment), digitalization and IT-security.[6] The status of the digitalization of hospitals will be evaluated in 2021 and 2023 and it includes the creation of patient portals, electronic documentation of procedures, digital medication management and infrastructure for telemedicine, amongst others. This goes hand in hand with the required IT-Security and network structures to prevent any IT attacks.

> We are **investing** in their **digital future** - because the pandemic in particular has shown us how important **well-equipped** and **functioning hospitals** are.
>
> – Jens Spahn (German Health Minister)

OUTLOOK

What have we learned so far and how should we react in the future, when other emergencies come up? Here are our key takeaways:

1. RESPONSE PHASE – looking at China: be quick to react and make use of existing know-how from previous emergencies.

2. RECOVERY / PREPARATION PHASE – looking at Germany: when recovering, think long-term to help you prepare for possible future healthcare crises.

Influence on construction time for emergency hospitals

Reduce time	Increase time
✓ Assertive strategy and planning	X Wrong strategy and no planning
✓ Standardized and proven systems	X New systems & procedures
✓ Construction site is in the outskirts of a city and allows for easy access of heavy machinery	X Construction site is in a crowded city or street which limits the access of heavy machinery
✓ Building horizontally will allow working in parallel	X Building vertically will require working simultaneous
✓ Using prefabricated materials	X Traditional construction without prefabricated materials
✓ Using light materials allows for slab on grade foundations	X Multi-story buildings with heavy materials require more complex and time consuming foundations

EC can support customers during the Planning & Execution phases, delivering expert and proven know-how on BIM-based Design & Supervision.

[6] https://www.bundesgesundheitsministerium.de/krankenhauszukunftsgesetz.html