



● Construction Law Advisory

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Subject **Impacts of COVID-19 on Productivity in Construction Projects**

The COVID-19 pandemic has had substantial impacts on productivity in construction projects. This article provides an analysis of the causes and quantification of such impacts.

Summary

Construction productivity in its most basic form is defined as the quantity of “inputs” required to produce an “output”.¹ Typically, the inputs of a contractor consist of labour, equipment and materials needed to complete a project. The resulting output is the progress made, which for example may take the form of a building or paved roadway. When the required inputs are greater per unit of work performed than that which the contractor anticipated when developing its bid, a loss of productivity occurs.

The COVID-19 outbreak had major impacts on the construction industry. New safety measures and rules directly impacted productivity. Similarly, new working environments created angst and uncertainty amongst workers, further contributing to productivity losses. Mental health challenges have risen significantly since the pandemic began, especially amongst individuals in the construction industry.

Until recently, attempting to differentiate and quantify the cumulative productivity impacts of COVID-19 on construction projects was a challenge. Stakeholders could contemplate possible or perceived impacts in seeking compensation, but no precise metrics were available. Empirical

¹ JS Held University. (2021, March). Empirical Productivity Impacts of the Novel Coronavirus. <https://assets.jsheld.com/uploads/Empirical-Productivity-Impacts-of-the-Novel-Coronavirus-Second-Edition.pdf?mtime=20210322183611&focal=none>

- studies in North America and the United Kingdom have now provided accurate measures for estimating the productivity losses. As described below, the losses attributable to COVID-19 are generally in the range of at least 15 to 22 percent, with even greater losses observed for certain types of work.

Impact of Government Measures on Productivity

Research demonstrates that much of the losses in productivity and efficiency are attributed to government-mandated safety measures designed to protect the workforce by curbing the spread of COVID-19. In the construction industry such measures have encompassed, for example, crew size reductions to accommodate social distancing requirements, and sanitizing of tools, equipment, work areas and materials.²

Furthermore, according to a survey of construction project managers conducted in the United States, productivity has decreased because workers have failed to report to work for various reasons, including quarantining requirements, caring for children because of school closures, and fear of being infected at work.³ This has also necessitated the recruitment and training of replacement workers, consuming additional time and resources. Lack of productivity of construction workers has also been attributed to negative changes in mental health, as detailed below.

Psychological Impacts of COVID-19 on Productivity

i. Psychological Impacts on the Workforce

Data collected in 2021 by Mental Health Research Canada (MHRC) from 3,000 Canadians revealed that during the COVID-19 outbreak, Canadians recorded the highest level of anxiety (25

² Schoppman, G. (2021, March 1). The Silver Lining of Construction Productivity and COVID-19. FMI. <https://www.fminet.com/fmi-quarterly/article/2020/12/the-silver-lining-of-construction-productivity-and-covid-19/>

³ Alsharif, A.; Banerjee, S.; Uddin, SMJ.; Albert, A.; Jaselskis, E. Early Impacts of the COVID-19 Pandemic on the United States Construction Industry. Int. J. Environ. Res. Public Health 2021, 18, 1559. <https://doi.org/10.3390/ijerph18041559>

percent) and depression (17 percent) to date.⁴ During the height of first wave of the pandemic, the level of depression amongst Canadians increased by 70 percent. Within the overall Canadian population, younger Canadians (aged 18-34), who make up a large portion of the Canadian work force, are more likely to experience anxiety and depression than their older counterparts.

Studies illustrate that one of the most common causes of anxiety and stress amongst workers during the pandemic is related to the risk of contagion in the workplace and the adoption of preventive procedures. A research paper published in the International Journal of Environmental Research and Public Health concluded that the pandemic had major psychological impacts on members of the workforce.⁵ New mental health issues have emerged as people cope with changed working conditions and novel stressors. Existing mental health issues have been exacerbated. In addition, many workers have experienced burnout, which frequently results from chronic workplace stress and can impact an individual's motivation and productivity.⁶

In a survey of 132 construction workers, it was found that working environment had the greatest influence on psychological anxiety.⁷ Factors including a shortage of personal protective equipment (particularly in the early stages of the pandemic); physical weight and inconvenience caused by wearing such equipment; fear of infection and the associated risk of harm to family members; conflict between safety procedures and the desire for social interaction; longer working hours; increased multitasking; and the stigmatization of infected people returning to work after quarantine all deeply affect the mental well-being of workers. As a result, workers may develop a

⁴ Mental Health During COVID-19 Outbreak: Poll #5 of 13 in Series (Data collected in February 2021) <https://static1.squarespace.com/static/5f31a311d93d0f2e28aaf04a/t/6038203f6a639e356c55461e/1614291009266/MHRC+Poll+5+Final+Public+Release.pdf>

⁵ Giorgi, Gabriele, Luigi Isaia Lecca, Federico Alessio, Georgia Libera Finstad, Giorgia Bondanini, Lucrezia Ginevra Lulli, Giulio Arcangeli, and Nicola Mucci. "COVID-19-Related Mental Health Effects in the Workplace: A Narrative Review." *International Journal of Environmental Research and Public Health* 17, no. 21 (2020): 7857.

⁶ Both Remote and On-Site Workers are Grappling with Serious Mental Health Consequences of COVID-19. <https://www.kff.org/policy-watch/both-remote-and-on-site-workers-are-grappling-with-serious-mental-health-consequences-of-covid-19/>

⁷ Shin, Y. and Kim, G.H., 2015, January. An analysis of the psychological anxiety factors of construction workers. In 2015 International Symposium on Computers & Informatics (pp. 1149-1154). Atlantis Press.

- range of behavioral (e.g., direct consequences on performance), physical (e.g., headache, gastric disturbances), and psychological (e.g., mood swings, lowered motivation, depressive thoughts, feelings of isolation) reactions leading to decreases in productivity.⁸

ii. *Psychological Issues and Decreased Productivity in Construction Workers*

Mental health challenges impact both the wellbeing and productivity of construction workers. A study from 2017⁹ analyzed the effects of psychological conditions of fieldworkers in the construction industry and concluded that, in accordance with findings of the World Health Organization,¹⁰ mental health problems such as stress, personality disorder, depression and anxiety (all of which can also lead to substance abuse) can affect the ability of workers to perform work safely and can lower productivity. In the construction industry, many studies have identified mental health as a critical factor influencing safety and productivity. Occupational stress (e.g., heavy workload, job insecurity), organizational stress (e.g., inefficient communication, interpersonal conflicts, lack of rewards), and environment-related stress (e.g., inadequate personal protective equipment, excessive noise, severe weather conditions) can reduce workplace safety and productivity. Worker anxiety causes avoidance and procrastination, unnecessary task-switching, and excessive worry about completing a given task, leading to delays in work output.¹¹ An American study¹² analyzed the various ways anxiety impacts workers and concluded that it has negative effects on the following:

- Workplace performance (56 percent)

⁸ Giorgi, above at note 5.

⁹ Lim, Soram, et al. "Analyzing psychological conditions of field-workers in the construction industry." *International journal of occupational and environmental health* 23.4 (2017): 261-281.

¹⁰ World Health Organization (WHO). *Mental health policies and programmes in the workplace*. Geneva, Switzerland: WHO; 2005.

¹¹ Geddes, S. (2020, March 10). How anxiety can affect our attention and concentration at work and what to do about it. A Lust For Life - Irish Mental Health Charity in Ireland. <https://www.alustforlife.com/tools/mental-health/how-anxiety-can-affect-our-attention-and-concentration-at-work-and-what-to-do-about-it>

¹² Razzetti, G. (2018, August 27). Why Anxiety Is the Number One Productivity Killer | By Gustavo Razzetti. Fearless Culture. <https://www.fearlessculture.design/blog-posts/why-anxiety-is-the-number-one-productivity-killer>

- Relationships with coworkers and peers (51 percent)
- Quality of work (50 percent)
- Relationships with superiors (43 percent)

Anxiety has been coined “the number one productivity killer”, as 40 percent of workers experience persistent stress or excessive anxiety in their daily lives and 72 percent find that it interferes with their job performance and personal lives.

Other studies revealed that depression and anxiety were strongly linked to long-term productivity losses and safety issues by causing motivation, satisfaction, and emotional problems. This is relevant during the COVID-19 pandemic as many studies point out that mental health issues are exacerbated during the pandemic, with approximately half of the population being affected by symptoms of anxiety.¹³ Research indicates that individuals working during the pandemic face unique threats to mental health and wellbeing depending on which sector they work in and their potential for exposure to the coronavirus, with construction workers being at one of the highest levels of risk for increased mental health issues.¹⁴

Quantification

Quantifying the impact of COVID-19 on productivity in the construction industry is critical because it allows for equitable compensation of past losses and formulation of more accurate cost projections. Empirical studies conducted in North America and the United Kingdom provide concrete data on the magnitude of the losses.

¹³ da Silva, Marianne Lucena, Rodrigo Santiago Barbosa Rocha, Mohamed Buheji, Haitham Jahrami, and Katiane da Costa Cunha. "A systematic review of the prevalence of anxiety symptoms during coronavirus epidemics." *Journal of Health Psychology* 26, no. 1 (2021): 115-125.

¹⁴ Both Remote and On-Site Workers are Grappling with Serious Mental Health Consequences of COVID-19. <https://www.kff.org/policy-watch/both-remote-and-on-site-workers-are-grappling-with-serious-mental-health-consequences-of-covid-19/>

- A study of 70 medium-sized construction projects in the United Kingdom found that COVID-19 caused a typical productivity loss of 15 percent.¹⁵ Of this, labour shortages and social distancing measures accounted for a combined 7 percent, with late or unavailable materials contributing another 7 percent. The final 1 percent was attributable to poor transfer of design information while remote working.

Compass International conducted a survey of construction managers, site superintendents and estimators on industrial projects in Canada and the US to assess the productivity losses arising on various projects. The results indicate that pandemic-related losses are typically in the range of about 10 to 35 percent, depending on the type of work involved. For example, site clearance experienced losses of 10 percent, while losses for concrete work and the installation of towers and other major equipment were as high as 25 percent. In all cases, losses for indirect site work, including material distribution, clean-up, administration, and transport ranged up to 25 percent.¹⁶

A study commissioned by ELECTRI International analyzed the productivity losses suffered by electrical contractors as a result of COVID-19.¹⁷ The losses were divided into two main categories: *mitigation tracking* (which quantifies hours consumed carrying out measures designed to reduce the risk of exposure to the virus, such as training, health screenings, cleaning and disinfecting, job site access, and administration) and *productivity benchmarking* (which quantifies the reduction in direct work productivity resulting from factors such as social distancing, staggered shifts, reduced crew sizes, use of increased personal protective equipment, related job site regulations, extra

¹⁵ Turner and Townsend. (2020, June 23). UK construction counts the productivity cost of COVID-19. Turner & Townsend. <https://www.turnerandtowntsend.com/en/news/uk-construction-counts-the-productivity-cost-of-covid-19/>

¹⁶ Compass International Inc. (2020). COVID-19 Construction Productivity Changes. https://compassinternational.net/wp-content/uploads/2021/03/CompassInternational_COVID-19ConstructionProductivityChanges_02-21-2-1.pdf

¹⁷ ELECTRI International. Conducted by Maxim Consulting Group and Marquette University. (2020, August). Pandemics and Construction Productivity: Quantifying the Impact. <https://ecaottawa.org/wp-content/uploads/2021/01/PandemicAndConstructionProductivity-Final-Report-August.pdf>

- mobilizations/demobilizations, work fatigue from anxiety and excess absenteeism, and altered delivery of materials).

Based on a random sampling of more than 92,000 labor hours in the electrical industry across the United States and Ontario, ELECTRI International found an 8.9 percent productivity loss as a result of *mitigation tracking*, with a further 12.9 percent loss associated with *productivity benchmarking*. Importantly, these two metrics are additive, such that the average productivity impact was found to be 21.8%. The study concludes that this result constitutes a suitable baseline for productivity loss across a wide array of projects, with modifications to be made based on the specific circumstances at hand.

A similar study was conducted by New Horizons Foundation using the same *mitigation tracking* and *productivity benchmarking* measures for sheet metal, HVAC and mechanical contractors from a random sample of over 20,000 labour hours across the United States.¹⁸ The New Horizons study found negative impacts of 8.7 percent for *mitigation tracking* and 9.2 percent for *productivity benchmarking*. These metrics are again additive, for a total productivity loss of 17.9%.

Combined, the above studies signify that the presumed starting point for productivity loss is in the range of 15 to 22 percent, with adjustments to be made based on the particular circumstances of the project and the type of work involved.

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¹⁸ New Horizons Foundation: An HVAC and Sheet Metal Industry Initiative. (2021, May 10). Pandemics and Productivity: Quantifying the Impact » COVID-19 Report. New Horizons Foundation.
<https://www.newhorizonsfoundation.org/project/pandemics-and-productivity-quantifying-the-impact-report/>