



# PERSPECTIVES

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## Empirical Productivity Impacts of the Novel Coronavirus

Our perspectives feature the viewpoints of our subject matter experts on current topics and emerging trends.

## INTRODUCTION

As of March 2021, the construction industry has experienced almost a year of the COVID-19 pandemic and more information continues to become available as to the initial and perceived continued impacts that the pandemic had upon contractors' costs and production rates. Two tenets key to understanding cost and resource productivity still reign:

1. If a contractor is experiencing working conditions that require additional measures, the contractor should endeavor to contemporaneously capture the impacts of an issue(s) on its work that were not reasonably expected. In other words, there is no difference between capturing the time and costs associated with possible COVID-19 impacts from other issues that may cause impacts to productivity.
2. Reliably demonstrating the impacts to productivity still relies upon developing reasonable causation between the possible impacts of an issue (in this case, the COVID-19 pandemic) upon the actual resource productivity. This has long been a standard that contractors were expected to produce even before the pandemic.

In addition, each project is different and should be evaluated individually. Other factors that may affect a contractor's productivity might also include project type, location, scope of a contractor's work, and perhaps most importantly, the contractor's training of its personnel in working safely and productively.

As of the date of this publication, no study has concluded that every construction or restoration project has experienced delay, disruption, or increased costs due to the COVID-19 pandemic. The evaluation of schedule delay, labor productivity, material availability and cost overruns should be performed on a project-by-project basis. Further, the overall degree of reliability of the studies referenced in this paper should be reviewed within the context of the constantly evolving and changing impact of the global pandemic. The impact of COVID-19 in all facets of life, including construction, has been dynamic and varying in nature, with restrictive measures changing from month-to-month and location-by-location.

Since the onset of the novel coronavirus in the first quarter of 2020, substantial guidance has been issued by construction industry leadership regarding perceived and potential impacts to construction projects from the COVID-19 pandemic. Much of the discussion has revolved around best practices and potential legal theories whereby additional costs and/or lost time may be recovered.

Contract law requires that a party to a contract need not only demonstrate its legal entitlement to the recovery of lost time and/or monies but that it must also reliably demonstrate its sustained monetary damages stemming from the actions or events that gave rise to its entitlement. In the absence of such calculable figures, a party may fail in its attempt at recovery.<sup>1</sup>

Notwithstanding the guidance provided regarding entitlement to the recovery of pandemic-driven losses, information as to the quantifiable extent of impacts to construction projects has been largely absent (if not entirely). However, two United States-based construction industry organizations performed a joint study in the Summer of 2020 which published empirical information regarding quantifiable impacts related to the pandemic. A separate study performed on a limited number of construction projects in the United Kingdom yielded similar results: that some construction trades in both countries have experienced a 15-18% loss of productivity stemming from the COVID-19 pandemic.

According to Merriam-Websters dictionary, "empirical" is defined as:<sup>2</sup>

*"Originating in or based on observation or experience; relying on experience or observation alone without due regard for system and theory; capable of being verified or disproved by observation or experiment; of or relating to empiricism."*

The information produced in the reports may gain the attention of the global construction industry as the metrics provided may apply to each project. That is, every project across the globe may have sustained impacts from the COVID-19 pandemic. Contractors, subcontractors, and owners alike may consider the information from the reports with respect to work performed during the pandemic as well as future work that is expected to operate in pandemic-driven circumstances.

<sup>1</sup> Ohara, Carina Y., et al., editors. Fundamentals of Construction Law. American Bar Association, 2001, pp. 249-50.

<sup>2</sup> Merriam-Webster. (n.d.). Empirical. In Merriam-Webster.com dictionary. Retrieved September 12, 2020, from <https://www.merriam-webster.com/dictionary/empirical>

Project stakeholders, and especially contractors, should not overlook the potential ramifications of the pandemic on projects, for it takes time for the full impact of lost productivity (and other impacts) to manifest themselves in a contractor's schedule, project cost ledger, and/or financials. If a contractor is not diligent in maintaining adequate records it may find itself unable to recover lost time and/or costs for which it may be entitled.

This paper discusses the above-mentioned studies and how the information therein may be used in evaluating and analyzing the possible impacts of the COVID-19 pandemic upon contractors' production.

## CONSTRUCTION PRODUCTIVITY AND WHY IT IS CRITICAL TO PROJECT SUCCESS

Prior to exploring the details of the studies, this paper will address the fundamental concept of construction productivity and why it is considered instrumental to the success (or failure) of a construction project. In its most basic form, construction productivity (and productivity, generally) is defined as the amount of "inputs" required to produce an "output". The work of a contractor requires the expenditure of resources in order to produce outputs, or the actual placement of the construction work.

Typically, the "inputs" of a contractor consist of labor, equipment, and materials that are employed in the performance of a contractual scope of work. The result of the inputs are the "outputs", which may include, for example, the installation of building foundations, the erection of a building super-structure, the installation of mechanical and electrical systems, the trenching of a pipeline, or the paving of a roadway.

According to construction industry materials, productivity is also defined as "the output per hour of input," or the "relative measure of labor efficiency, either good or bad, when compared to an established base or norm as determined from an area of great expertise. Productivity change may be either an increase or decrease in cost."<sup>3</sup>

Productivity is considered paramount in the performance of a contractor because 1) construction contractors typically formulate bids based on an estimated rate of productivity per unit of material installed; 2) construction projects usually have a definable date in which the work is to reach completion (which is driven by production<sup>4</sup> and productivity); and 3) construction contractors are often paid on the basis of work completed (in contrast to payment per unit of input, e.g. a labor hour). Thus, for a contractor to fulfill its contractual obligations and still make a profit, the actual productivity achieved should perform to (or similar to) the estimated efficiency included in its bid.

In some instances, as a contractor attempts to produce outputs, the required input (often, a "labor hour") is actually greater per unit of work installed than that which was assumed when the contractor developed its bid. Depending upon contract terms and prevailing law, when the causes and reasons for elevated resource requirements are beyond the contractor's control or ability to foresee (at the time of bidding), the contractor may stand to recover the increased costs resulting from the reduced productivity. When this occurs, the contractor is said to have experienced a "loss of productivity" or "loss of efficiency." Considering that labor costs are often the largest cost component to a contractor, it follows that losses in productivity can become substantial.<sup>5</sup>

Losses in construction productivity is a topic with substantial case law and related industry studies. According to the Association for the Advancement of Cost Engineering International ("AACE"), lost labor productivity is described as:<sup>6</sup>

*"Productivity loss, therefore, is experienced when a contractor is not accomplishing its anticipated achievable or planned rate of production and is*

<sup>3</sup> McDonald, D. F., & Zack Jr., J. G. (2004). Estimating Lost Labor Productivity in Construction Claims. In AACE International Recommended Practice No. 25R-03 (Rev. April 13, 2004 ed., p. 2). N.p.: AACE International.

<sup>4</sup> Production (as contrasted to "productivity") is often described as the progress or rate of the contractor per unit of time, with no recognition of the quantum of input(s) necessary to meet a certain rate of progress.

<sup>5</sup> AACE International. Skills and Knowledge of Cost Engineering. 6th ed., AACE International, 2015, p. 270.

<sup>6</sup> McDonald, D. F., & Zack Jr., J. G. (2004). Estimating Lost Labor Productivity in Construction Claims. In AACE International Recommended Practice No. 25R-03 (Rev. April 13, 2004 ed., p. 2). N.p.: AACE International.

*best described as a contractor producing less than its planned output per work hour of input. Thus, the contractor is expending more effort per unit of production than originally planned. The result is a loss of money for a contractor. Therefore, a challenging aspect of construction cost control is measuring and tracking work hours and production in sufficient detail to allow analysis of the data in order to determine the root cause(s) of poor labor productivity, should it occur.”*

In many instances, a contractor may indeed achieve the planned rate of production (progress its work according to the project schedule) yet not achieve its anticipated rate of productivity. For example, a contractor may be required to dedicate twice the amount of resources to a project in order to maintain a certain rate of production. In such a scenario, even though a contractor may achieve a necessary rate of production, a substantial loss of productivity may be incurred in doing so.<sup>7</sup>

With the above concepts in mind, this paper introduces empirical-based metrics which represent the extent of possible sustained impacts to construction productivity during the initial period of the pandemic (up to June 2020). This paper also introduces other considerations and possible “best practices” for owners and contractors for work performed prior to and during the pandemic.

## Results from Construction Industry Studies of Quantified Impacts to Production Prior to August of 2020

During the summer of 2020, two reports were released addressing the results of productivity data collected and analyzed on active construction project sites in the United States (“US”) and the United Kingdom (“UK”). The first study, released in late June 2020, reported on productivity losses experienced on projects within the UK while the second report, released in July 2020, contained

the results of studies performed on projects within the US.<sup>8,9</sup> The findings summarized in the reports are similar – construction projects in both countries have experienced a 15-18% diminution in productivity stemming from the COVID-19 pandemic.

## COVID-19 Causes 35% Productivity Loss at UK Projects as of July 2020

In the report released from the UK, the loss of productivity impact on construction project labor was reported to be “about 35%” because of COVID-19.<sup>10</sup> The study was based on an analysis of forty-five (45) projects that performed construction work during the global pandemic. A news headline that goes on to report the published results stated labor shortages (presumably caused by the pandemic) and social distancing measures accounted for approximately 7% of incurred productivity losses; that 1% of productivity was lost through “poor transfer of design information while remote working;” and an additive 7% of productivity was lost because of late or unavailable materials.

The report stated that a single project had incurred a 35% productivity loss attributable to the novel coronavirus but details that 20% (of the 35%) was attributable to “an average 20% productivity loss,” and that the remaining 15% was attributable to the pandemic.

The report goes on to state that construction projects in the UK have “systemic productivity challenges,” which often force contractors to “accelerate” (or dedicate additional resources to a project to increase rates of production) so that contractual milestones are not violated. However, the report noted that acceleration measures may be unavailable as an option for projects operating under pandemic-driven health and safety protocols. That is, to adhere to social distancing measures, a limit may be placed as to the amounts of additional laborers a contractor may place on the work fronts. In such instances, a contractor may instead face consequences for failing to finish according to its contract.

<sup>7</sup> McDonald, D. F., & Zack Jr., J. G. (2004). Estimating Lost Labor Productivity in Construction Claims. In AACE International Recommended Practice No. 25R-03 (Rev. April 13, 2004 ed., p. 2). N.p.: AACE International.

<sup>8</sup> Rubin, D. K. (2020, June 29). Analysis: COVID-19 Causes 35% Productivity Loss at UK Projects. In Engineering News-Record. Retrieved from <https://www.enr.com>; McLin, M., Doyon, D., & Lightner, B. (2020).

<sup>9</sup> McLin, M., Doyon, D., & Lightner, B. (2020). Mitigation and Productivity Impacts for Sheet Metal, HVAC, and Mechanical Contractors. In Pandemics and Productivity: Quantifying the Impact. Chantilly, VA: New Horizons Foundation.

<sup>10</sup> Rubin, D. K. (2020, June 29). Analysis: COVID-19 Causes 35% Productivity Loss at UK Projects. In Engineering News-Record. Retrieved from <https://www.enr.com>; McLin, M., Doyon, D., & Lightner, B. (2020).

The report also stated that, in early July, U.K. officials announced the reduction of social distancing measures in England to a required distance of “1m+.” Projects in Scotland, Wales, and Northern Ireland continued to follow their respective country’s rules. However, the report noted that many of the measures implemented by contractors since the onset of the pandemic would continue to be voluntarily enforced (many of which were more restrictive). Thus, although some jurisdictions in the UK have relaxed social distancing measures, some contractors may continue to enforce the more restrictive measures. In such instances, a contractor may face exposure to its subcontractors for additional costs incurred because of the refusal to relax social distancing measures, and/or preclude the subcontractor from accelerating its work.

## SMACNA Report: “Pandemics and Productivity: Quantifying the Impact”

In July of 2020, two US-based construction industry organizations, the Sheet Metal and Air Conditioning Contractor’s National Association (“SMACNA”) and National Electrical Contractors Association (“NECA”), released a joint report based on the analysis of “113,000” labor hours<sup>11</sup> incurred on job sites in twenty-one (21) states that operated under pandemic-driven protocols and conditions.<sup>12</sup> Construction worker activity was collected from various types of primarily new build projects, including Commercial Facilities, Chemical, Manufacturing, Governmental, Energy, Infrastructure, Healthcare, Transportation Systems, and others.

The results of the study are noteworthy because, to date, no other US-based information or resource(s) had been available that provided for an empirical-based quantification of impacts to productivity arising out of the pandemic. Construction project stakeholders have merely observed possible or perceived impacts and have discussed scenarios in which a party might be entitled to additional time and/or money. However, beyond such general commentary, documented efforts to establish a firmer “causal connection” to a loss in productivity were not widely available.

The results of the SMACNA/NECA study are summarized as follows:

- During 2020, construction labor forces working under pandemic-driven protocols and conditions experienced a composite 8.8% loss in labor productivity due to “Jobsite Mitigation Measures” implemented to prevent exposure and/or spread of the virus. Such measures consisted of the “Management of Personal Protective Equipment (PPE),” “Safety Meetings & Orientations,” “Time Waiting to Access Work Areas,” “Respirator Training & Fitting,” “Time Waiting for Medical Screenings,” “Cleaning & Disinfection of Common Areas,” “Worksite and Workfront Access Protocols,” “Extra Distance for Lunch and Break Areas,” “Cleaning & Disinfection of Tools/Equipment/Gear,” and additional time of “Administration Procedures.” Now, a year into the pandemic, owners and contractors (with guidance from governmental agencies and health care professionals) have figured out how to accomplish these measures and to do so in as efficient a method as possible, and to document the time and effort to do so.
- During 2020, construction labor forces working under pandemic-driven protocols and conditions experienced a 9.2% loss of labor productivity during operations. The study indicates that such additional impact may be attributable to “Extra Demobilization and Re-mobilizations,” “Worker Fatigue from Anxiety and Absenteeism,” “Social Distancing Protocols During Work Activities,” “Off-Shift Work,” “Altered Material Delivery and Receiving Procedures,” “Additional Inspections During Work Performance,” “Cleaning Requirements,” and others. These are typical impacts that a contractor may have experienced before the pandemic. The importance of documentation cannot be understated, and, at times, efforts to discretely capture or accurately estimate (e.g., for “Extra Demobilization and Re-mobilizations”) should be reasonably attempted. The contractor should also be aware that as the understanding of the COVID-19 virus increased after the first wave in early to mid-2020, and the mitigation measures became more consistent, then impacts to productivity would reasonably be assumed to have at least been reduced, if not eliminated. The maturation of these measures and the resiliency of the industry in dealing with them is analogous to the fall protection measures requiring many trades to wear full body fall protection harnesses

<sup>11</sup> The 113,000 labor hours are a combination of man-hours from the SMACNA and NECA studies. SMACNA sampled 20,000 man-hours while NECA sampled 92,000 man-hours.

<sup>12</sup> McLin, M., Doyon, D., & Lightner, B. (2020). Mitigation and Productivity Impacts for Sheet Metal, HVAC, and Mechanical Contractors. In *Pandemics and Productivity: Quantifying the Impact*. Chantilly, VA: New Horizons Foundation.



now many years ago. At first, these measures had a marked impact upon productivity, but as the labor force became accustomed to the measures, the effects, if any, were discounted.

- Together, the above figures amount to a total potential impact of 17.9%, or a maximum of 86 minutes lost during an 8-hour workday for each affected worker. The amount of time “lost” each working day may accumulate to approximately seven (7) hours each week and twenty-nine (29) hours each month for each worker.<sup>13</sup> The study concluded that workforces would have utilized the lost time to instead perform work.

As it relates to the Jobsite Mitigation Measures and the methods utilized to collect and analyze the data, the report explained that project supervisors observed and entered

data on a daily basis into an application for the specific purpose of recording impacts during the sixty-five (65) day period of April 30, 2020 through July 3, 2020. The crew types for which data was collected included HVAC/Sheet Metal Crews, Mechanical Crews, Plumbing Crews, and Composite (Combined Trades) Crews.

Throughout the period of data collection, field supervisors entered data according to one of four observed categories (as applicable). These categories, and the time of construction workers related to each respective category of mitigation are listed in the below table. Together, they demonstrate the quantity of hours dedicated to each category of the various measures as summarized into “Mitigation Protocols”:

Mitigation Protocol	Hours Lost to Mitigation SMACNA Data	Hours Lost to Mitigation, NECA Data	Total Hours Lost to Mitigation	% of “Total Hours” to “Total Hours Sampled”
1. Safety & Training	470	1,759	2,229	2.0%
2. Distancing & Access Rules	439	3,642	4,081	3.6%
3. Cleaning & Distancing	580	2,259	2,839	2.5%
4. Administration	326	642	968	0.9%
<b>Subtotal</b>	<b>1,815</b>	<b>8,302</b>	<b>10,117</b>	<b>8.9%</b>
<b>Total Hours Samples</b>	<b>20,893</b>	<b>92,320</b>	<b>113,213</b>	

*Table 1 - Hours per Category of Mitigation Protocol*

The report cautioned, “contractors should not be required to itemize the 8.8% loss into sub-categories since all categories require management on active projects during a pandemic. Federal distancing guidelines, Occupational Safety and Health Administration (“OSHA”) requirements, and the resulting general contractor and subcontractor safety plans apply to most active projects, regardless of region or type.”<sup>14</sup>

The second portion of the study, “Productivity Benchmarking,” addressed impacts to construction activity not related to mitigation protocols. The study concluded that contractors lost an additional 9.2% in productivity due to “Extra Mobilizations/Demobilizations,” “Work Fatigue from Anxiety and Excess Absenteeism,” “Social Distancing Effects,” “Off-Shift Work,” “Altered Delivery & Material Receiving,” and “Inspection and Cleaning Requirements,” among others.

<sup>13</sup> Figures assume a working schedule of 8-hours per workday, 5 days per week.

<sup>14</sup> According to the report, the following standards are referenced by OSHA as being applicable in times of pandemic: “29 CFR § 1904, Recording and Reporting Occupational Injuries and Illness,” “29 CFR § 1910.132, General Requirements – Personal Protective Equipment,” “29 CFR § 1910.133, Eye and Face Protection,” “29 CFR § 1910.134, Respiratory Protection,” “29 CFR § 1910.141, Sanitation,” “29 CFR § 1910.145, Specification for Accident Prevention Signs and Tags,” “29 CFR § 1910.1020, Access to Employee Exposure and Medical Records,” and “Section 5(a)(1), General Duty Clause of the OSH Act.”

The data was collected for specific construction tasks that allowed for the determination of “percent of work completed and the hours expended for common tasks.” Similar to the Jobsite Mitigation Measures, the data was collected in a “formalized gathering process” for sheet metal, mechanical, and plumbing contractors which was then used to analyze contractor productivity over time.

The results of the analysis reflect that from January 5, 2020 through June 21, 2020, the average reduction in contractors’ productivity was 9.2%. The analysis also suggested a level of correlation between productivity and national-level events such as the creation of an “Incident Management” by the Center for Disease Control (“CDC”) on January 7th, the declaration of a Public Health Emergency on January 31st, the declaration of a National Emergency on March 13th, the issuance of Shelter-in-Place orders on March 22nd, and the signing of the initial \$484 billion stimulus package on April 24th, to name a few.<sup>15</sup> The data cited in the Report indicated that there was an apparent stabilization in the reported effects on productivity after May 2020, and leveled off in June 2020 (the last reported data).

Considering that the SMACNA/NECA study was performed almost a year ago, owners and contractors should evaluate each project independently and consider possible causes of productivity loss that may (or may not) have a relationship to its work environment that may have been adapted to address the COVID-19 pandemic.

## CONSIDERATIONS FOR CONTRACTORS

Based on the results summarized in the SMACNA/NECA Report, parties to current and/or future construction projects may possibly gain guidance for the following purposes:

- Support in quantifying cost and schedule impacts for purposes of seeking equitable adjustments for lost productivity and schedule delays, while remaining mindful of the need to develop sufficient causation.

- Pricing upcoming work (new contracts or changes to existing project scopes) that may possibly be affected by pandemic-driven protocols and conditions. However, the contractors should now be aware in 2021 that the uncertainties of early to mid-2020 have largely dissipated, and with vaccine roll-outs and “standard” mitigation measures becoming the norm, any pandemic “sur-charge” is likely increasingly unsubstantiated and lead to lost contracts.
- Formulating financial projections that account for stress on cash flows due to decreases in productivity and increases in overhead costs; and,
- Utilizing the conclusions of the study to support and substantiate the added costs/impacts.<sup>16</sup>

According to the report, the information generated from the study was published to assist contractors (and project owners) in the calculation of productivity impacts incurred on 1) work performed during the months of 2020 in which its workforce(s) operated under pandemic-stricken circumstances and 2) future work that is reasonably expected to be performed under similar pandemic-driven working conditions.

### Work Performed to Date

The SMACNA/NECA Report suggested construction contractors prepare and submit change order requests seeking relief from sustained impacts on work performed to date. To the extent that a contractor can reliably demonstrate that the Jobsite Mitigation Measures and items considered in the Benchmarking Study caused adverse impacts, the contractor should follow industry-prescribed procedures (and/or applicable contract provisions) in preparing a request for relief to the offset additional costs.

Contractors should recognize that the mere existence of the results provided in the SMACNA/NECA Report do not entitle it to recovery of time and/or money. Generally, pending prevailing law (or contract provisions) to the contrary, a contractor may be entitled to the recovery of lost time or costs incurred as a result of influences beyond its control or reasonable expectations, yet may fail in attempts to do so if

<sup>15</sup> McLin, M., Doyon, D., & Lightner, B. (2020). Mitigation and Productivity Impacts for Sheet Metal, HVAC, and Mechanical Contractors. In *Pandemics and Productivity: Quantifying the Impact*. Chantilly, VA: New Horizons Foundation.

<sup>16</sup> McLin, M., Doyon, D., & Lightner, B. (2020). Mitigation and Productivity Impacts for Sheet Metal, HVAC, and Mechanical Contractors. In *Pandemics and Productivity: Quantifying the Impact*. Chantilly, VA: New Horizons Foundation.

its project record does not support its position.<sup>17</sup> Thus, even during a pandemic, a contractor should develop its request for relief so that it is able to meet the burden of proof.

In addition to accounting for pandemic-driven losses, contractors (and their business partners) should also remember to account for losses in productivity due to non-pandemic-driven reasons. As the industry has adapted to the effects of the pandemic, contractors should still consider the many common factors that may result in a loss of construction productivity may include absenteeism, acceleration, adverse weather conditions, availability of skilled labor, multiple changes (“Cumulative Impact”), craft turnover, crowding or stacking of trades, defective engineering, dilution of supervision, excessive overtime, insufficient coordination, out of sequence work, rework and errors, schedule compression, and many others.<sup>18</sup> In the instance a contractor is attempting to calculate losses in productivity not because of the pandemic, but the losses were incurred concurrent to any pandemic-driven productivity losses, care should be taken by the contractor to avoid “double counting” hours of lost productivity.

When attempting to quantify its monetary damages, a contractor should carefully consider whether it is appropriate to rely directly upon the metrics provided in the SMACNA/NECA Report. As has been the long-accepted standard, a contractor should continue to demonstrate a reliable connection between an issue and a productivity impact. Contractors may instead attempt to substantiate their calculations with references to the provided metrics. Either way, calculating losses in productivity from the pandemic is unique because the SMACA/NECA study has provided empirical-based metrics of losses in productivity. Many prevailing methods of calculating loss of productivity do not provide such specific metrics (typically a range is provided, if any). Often, a contractor is left to determine the “percent” (or quantity of hours, or costs) lost from an event or events that gave rise to the lost productivity.

An additional item to consider when attempting to quantify productivity losses is the extent and nature of work the contractor performed prior to the onset of the pandemic.

By adopting a “Measured Mile” approach, a contractor may consider referencing its “pre-pandemic” rates of productivity in contrast to its rates during pandemic working conditions.<sup>19</sup> This may be a worthwhile analysis if the contractor performed the same or similar work during both periods and the contractor’s records include a necessary degree of specificity that allows for such a comparison. If it can demonstrate diminished rates of productivity after the onset, and because of, the pandemic, in comparison to pre-pandemic rates of production (that, presumably, were better or more efficient), then such information may be helpful to include in requests for relief. In a similar fashion, contractors may consider progress in their project schedules prior to, and after, the onset of the pandemic in attempting to demonstrate delay.

## Bids for Future Work

An owner may take a position that a contractor should have accounted for expected pandemic-driven losses when formulating its bid and that the contractor’s failure to account for such losses in its bid should not become the financial burden of the owner. As a good practice, therefore, contractors may consider including line-items in their bids representing an estimate of the additional efforts due specifically to pandemic mitigation measures (but only to the extent that the contractor reasonably expects that such measures will be required). To avoid confusion, both parties may want to be clear as to the extent of expected mitigation measures prior to bidding and contractor execution.

A contractor may eventually find, however, that because of the vagaries of the shifting mitigation measures in different locales and by differing authorities, its productivity suffered more than it anticipated. Notwithstanding that a contractor “knew” about the pandemic, recovery of additional costs may be warranted if the actual conditions were different (or more extensive) than reasonably expected at the time the bid was prepared.

As of March 2021, a contractor should also consider the possibility that its work may not be impacted because of the pandemic. Instances of low to no productivity impacts

<sup>17</sup> Ohara, C. Y., Gatlin, C. T., & Wilshusen, F. D. (Eds.). (2001). Chapter 10: Construction Damages. In *Fundamentals of Construction Law* (p. 249). Chicago, IL: American Bar Association.

<sup>18</sup> McDonald, D. F., & Zack Jr., J. G. (2004). Estimating Lost Labor Productivity in Construction Claims. In *AACE International Recommended Practice No. 25R-03* (Rev. April 13, 2004 ed., p. 4-7). N.p.: AACE International.

<sup>19</sup> The “Measured Mile” is regarded as the preferred method in demonstrating inefficiency and calculating resultant damages. The Measured Mile compares a contractor’s rate of productivity during an “unimpacted” period to its rate of productivity during an apparent “impacted” period. The Measured Mile method is not always feasible, however. The reasons are many, but may include the absence of an unimpacted and impacted (or least impacted) period, the nature of the work performed in each period was not same or similar, or the nature in which the work was sequenced does not provide for a Measured Mile analysis.



might apply to contractors that were already experienced working in conditions that are similar to (or even more extensive) than those related to pandemic mitigation measures. These would likely include contractors that are or were already accustomed to working around contaminants or other hazardous materials, such as contractors involved in renovation and restoration. Traditionally, renovation and restoration work has been known to require additional safety protocols, such as personal protective equipment and jobsite safety coordination efforts, which were in effect prior to the pandemic. If so, the contractor should be aware that considerations of minimal to no impact should be reflected in its pricing.

## Financial and Cash-Flow Projections

The SMACNA/NECA Report also suggested contractors rely upon the results of the report as part of the maintenance of regular cash-flow and financial projections. To the extent that a contractor's projects have sustained adverse impacts because of the pandemic, a contractor should carefully account for the potential stress caused by the impacts on cash flows and overall financial projections. The SMACNA/NECA Report states that the financial impact of contractor productivity losses can take as long as three to six months to "fully play out in a company's finances." Such a scenario is plausible because, according to the report, losses in productivity may go unnoticed as conventional tracking, reporting, and projection mechanisms may not adequately account for lost productivity. The accuracy of cash flow projections may suffer if they do not reflect inefficient production and additional jobsite and/or home office overhead costs.

## Other Effects of Losses of Labor Productivity

Construction projects on which losses of productivity have occurred commonly also experience a prolonged project duration. When a project's duration is extended, the contractor usually incurs additional "time-related" costs. Such costs are in addition to increased costs of lost productivity and typically include the contractor's costs of jobsite overhead and home office overhead.

To fully account for the potential impacts to a contractor's time-related costs and schedule caused by the COVID-19

pandemic, the contractor may want to consider the following items:

- Prolonged equipment and machinery costs, directly related to the work, that are required for longer-than-expected durations due to decreases in productivity (and likely resulting in decreased rates of production).
- Costs of time-related jobsite overhead items that continue to be incurred as the project completion date is extended.
- Costs of home office overhead that may be claimable as the project completion date is extended and the home office is required to support the project for longer than expected; and,
- Costs of additional health and safety professionals operating on the jobsite to enforce the additional protocols and monitor for compliance.

The SMACNA/NECA Report advises contractors to also contemplate the possibility of increases in project overhead costs. "Overhead" costs in construction usually relate to one or two categories: "jobsite overhead" and "home office overhead." "Jobsite overhead," more commonly referred to as "general conditions" costs, are frequently those that are incurred by a contractor in support of a specific project but are not directly attributable to any particular installation effort or construction activity. Examples of general conditions usually consist of (but are not limited to) project management and supervision; cost of jobsite trailer rentals; office equipment; utilities such as heat and electricity for the jobsite facilities; telecommunications; internet access; office supplies; storage bins for tool, equipment, and materials; equipment for jobsite logistics; administrative staff such as accountants and estimators; to name a few. These costs are generally "fixed" in nature and, although they do tend to fluctuate over the course of a project, are considered a function of time (instead of a function of activity volume) because many categories of general conditions costs continue to be incurred as long as the contractor is on site. Thus, a contractor may stand to recover additional general conditions costs if it can show that it would have finished earlier if not for impacting events.

The other time-related cost, or “home office overhead”, are generally considered to be costs incurred in support of the ongoing operations of an enterprise. A contractor’s home office overhead typically consists of rents for office space; utilities; insurance; salaries and travel of executive personnel; salaries of accounting, human resources, marketing and legal personnel; advertising; and others. These costs are also theoretically “fixed” in nature as they are incurred on a continuing basis – they are not directly attributable to any single project.

As part of its regular practices a contractor may include a provision in its bid representative of its expected home office costs, then, as construction is performed, periodically “allocate” the actual costs of its home office to each project account (usually based on the proportion of direct costs incurred by each project for each period). The costs allocated each period represent the support provided by the home office to each project. Although the law related to a contractor’s entitlement to such damages is unsettled, where recognized, a contractor may recover “extended” or “unabsorbed” home office overhead damages in instances in which a project duration is extended or suspended.

Another item for a contractor to consider, related to a delayed or impacted project, is that it may incorrectly assume that labor and equipment resources will become available to perform “new work” (and generate “new” revenue), yet the resources, being trapped on existing projects due to issues that result in a prolongation of the project’s duration, do not start the new work as reflected in any corresponding financial projections.

As of March 2021, or almost a year after the onset of the pandemic, enough may be known regarding potential impacts from COVID-19 that construction project planning may be able to develop a reasonable schedule that provides for efficiency and a normal pace of work. According to accepted best practices in the construction industry, careful planning, in conjunction with known or possible issues, such as a pandemic, can reasonably alleviate impacts to construction work.

## CONCLUSION

The COVID-19 pandemic forced many contractors around the globe to alter standard jobsite procedures and, depending

upon the project type, location, scope, and trade, may have resulted in losses in productivity. However, as of March 2021, any effects from the pandemic are potentially being assimilated into the every-day working processes and, as the vaccine roll-outs continue, may disappear altogether. The results of the studies discussed, which were with respect to Sheet Metal, HVAC, and Mechanical contractors, applied to the period from March through July 2020.

The studies discussed in this paper have quickly brought into focus the potential quantifiable extent of impacts on construction productivity because of the pandemic. The information from the reports was shared as it may prove helpful to parties of a construction contract to facilitate discussions of equitable adjustments for work performed under different conditions because of the pandemic. Almost a year after the onset of the pandemic, however, the information from these reports should be treated carefully for future planning and costing because, as discussed, the results may no longer be applicable. As of March 2021, planning for future work should also account for current market conditions, and taken within the context of the particular project’s type, working conditions, locale, and the trades involved.

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