

EXPLORATORY STUDY ON CONSTRUCTION WORKERS MENTAL HEALTH

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ABSTRACT

Respect for people is a foundational Lean Construction principle which has received renewed attention since the COVID-19 pandemic when mental health issues became a major discussion topic. While governmental organizations track deaths by suicide and fatality rates, little is known about other mental health indicators in construction sites. This paper shares partial results of an ongoing research project on construction workers mental health (CWMH). A survey was developed with support of an industry advisory board. The national survey was deployed in the United States and received 151 usable responses by the end of 2024. Preliminary descriptive statistical analysis reveals that 40% of the respondents indicated that they agree or strongly agree that their work is more stressful than they ever imagined, whereas 57% indicated that they had little pleasure in doing things at least several days over the past month, a measure of depression. Regarding belongingness, 74% of respondents answered that they agree or strongly agree that they are treated as valued members of their work group. Results suggest that while workers are under stress, and might show signs of depression, belongingness is a strong element, which can be used as a lever to address CWMH issues.

KEYWORDS

Construction workers, mental health, well-being, respect for people

INTRODUCTION

The results presented in this paper are part of an ongoing research project about construction workers' mental health (CWMH). The study explored how to measure and understand the different aspects related to CWMH and how Lean Construction practice can potentially support CWMH. Respect for People is one of Lean Construction's tenets, but little is known about mental health indicators in construction sites, beyond statistics usually collected by governmental entities. Within the IGLC literature, multiple studies point out to the Last Planner System (LPS) and Integrated Project Delivery (IPD) contracts and how they promote collaboration and better work environments (Fauchier and Alves 2013, Fischer et al. 2014). Most recently, studies on psychological safety and its influence on team learning and collaboration (Gomez Villanueva et al. 2024, Häringer et al. 2024), worker involvement strategies including Lean Construction practices (Peinado and Costa 2023) and how workers

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are motivated (Schöttle 2020) have shed light on how workers and professionals relate to, or can be more involved with, their project teams.

To continue this conversation, this paper presents partial results of an ongoing study regarding mental health measures to explore the state of CWMH and to potentially shed light on how Lean Construction practices can be used to address mental health challenges facing construction workers.

The partial results discussed in this paper focus on results of a survey developed by the authors alongside an industry advisory board. The data presented focus on results obtained with questions aimed at investigating mental health measures including stress, depression, belongingness, and psychological safety. The paper starts with a literature review, followed by the research method, and concludes with a discussion of preliminary findings and future steps for the study.

CONSTRUCTION WORKERS MENTAL HEALTH (CWMH) IN THE CONSTRUCTION INDUSTRY

This literature review presents information related to the current state of the construction industry regarding CWMH, existing studies on the topic, and introduces the measures used in this study as proxies to investigate mental health constructs.

INDUSTRY BACKGROUND REGARDING CWMH

According to the United States Bureau of Labor Statistics (2024), in 2023, construction was the sector with the highest number of fatalities among all industry sectors in the United States (US): 1,075 (20% of the total when compared to 5,283 across all industry sectors), the highest number experienced dating back from 2011. Additionally, construction was the private industry sector with the highest number of fatalities for Hispanic or Latino workers, 410 (7%) out of 5,283 fatal work injuries. When foreign-born Hispanic or Latino workers are considered, over a third (37.5%, 315 out of 839) of the fatalities across industry happened in the private construction industry sector.

Despite the fact that construction workers are 7.4% of the US workforce, the group accounted for 17.4% of deaths by suicide. Both male and female construction workers presented the highest rates of death by suicide when compared to other industries and characterizations. However, there is a major imbalance as male construction workers represented the majority of the cases reported (97.8%), and workers who are White, non-Hispanic, single, and with high school or equivalent diplomas being the most affected group (Harris et al. 2021). The same study developed by Harris et al. (2021) also indicated that workers in the 35-44 years age group displayed the highest percentages when deaths by suicide were recorded and that iron and steel workers had the highest rates among construction occupations.

Currently, numerous organizations in the United States (US) are united in calling attention to mental health awareness and have launched programs to help companies deploy initiatives aimed at addressing the problem. For instance, the Associated General Contractors of America (AGC, 2025), one of the largest construction-related organizations in the US, has launched the Culture of Care program, which provides companies with materials and guidelines to promote awareness regarding mental health issues. AGC (2025) is promoting this program by calling on the industry to take their pledge: “*Culture of CARE is challenging leaders to take a bold and visible step towards ensuring their workplaces are welcoming, safe and inclusive for an increasingly diverse and talented pool of workers by taking the Culture of CARE pledge.*” Similarly, the Lean Construction Institute (LCI 2025) has focused their efforts on promoting the Respect for People culture which is a foundational piece of Lean Construction. The LCI has promoted events and supported a task force with industry leaders to raise awareness about the need to address the alarming rates of suicide and improve construction environments. For the

LCI (2025), Respect for People encompasses: “*recognizing and appreciating the value each member of the team brings; fostering an environment where people feel comfortable sharing concerns, knowing that others will listen and consider their perspectives; adapting a “problems first” attitude; a willingness from all members to accept that they might not know everything, and an openness to new ideas.*” Additionally, studies have pointed out to the need to further investigate the environments where construction workers develop their tasks given that these details are not usually associated with the reports on deaths by suicide (Harris et al. 2021, Tijani et al. 2023).

The construction work environment is characterized by: male-dominated cultures which value a tough ‘can-do’ attitude which contributes to those who need help been viewed as weak and sometimes called out and being judged for asking for help; seasonal work opportunities which contribute to financial hardships; projects with tight deadlines, cost, and specifications putting enormous pressure on workers who can all but control their own work, if resources are available, but have no control over other interacting activities; workers having to work away from home for long periods of time (workplacementalhealth.org). In addition to accident-prone environments, which result in high levels of fatalities, deaths by suicide are a major concern in the construction industry in the US and abroad (Tijani et al. 2023). A recent literature review by Tijani et al. (2023) pointed to the most recurrent problems found in previous studies including: job insecurity, alcohol and substance abuse, lack of help-seeking, and physical injury and chronic pain.

The literature reviewed discusses characteristics of work environments in the construction sector, and related statistics and demographics about accidents and fatalities rates. These are well-known and debated, however, little is known about measures related to CWMH in the construction industry. Practitioners and academics are aware of these characteristics, but more needs to be known about their impact on the mental health of the construction workforce at large. This study aims to use mental health measures validated by studies found in the literature at large to address this gap in the construction literature and potentially identify ways in which Lean Construction practices can be used to address the problems facing this workforce.

VALIDATED MEASURES OF MENTAL HEALTH-RELATED OUTCOMES

The authors reviewed the literature on CWMH and, with the support of a consultant from the field of Organizational Management, identified a group of validated measures to investigate mental health constructs in the construction industry. As explained in more detail in the research method section below, the authors worked with an advisory board (AB) to identify important issues affecting CWMH and discussed potential areas of investigation. With the support of the AB and the consultant, different constructs related to mental health were considered during the discussions: stress, depression, anxiety, belongingness, loneliness, psychological safety, and burnout/emotional exhaustion, among other elements that support/hinder mental health in work environments.

Table 1 shows the constructs that ultimately were included in the survey and are discussed in this paper. The first construct was defined using two questions about how workers perceive their job and how it impacts their well-being as a proxy for stress (Solomon et al. 2022): *A. My job is more stressful than I had ever imagined; B. I fear that the amount of stress in my job will make me physically or mentally ill.* The measures related to depression were based on the work of Kroeke et al. (2007) and Patient Health Questionnaires (PHQ) used to assess levels of depression: *Over the last month, how often have you been bothered by the following problems? A. Little interest or pleasure in doing things; B. Feeling down, depressed, or hopeless.*

Psychological Safety was represented in the survey based on the work developed by Edmondson (1999), and adapted from her 7-item scale to a 4-item scale by Madrid et al. (2024),

who used the four items with the highest factor loadings to characterize this construct: *A. It is safe to take a risk on this team (reverse worded when compared to Edmondson's 1999 work)*, *B. Members of this team are able to bring up problems and tough issues*; *C. No one on this team would deliberately act in a way that undermines my efforts*; *D. Working with members of this team, my unique skills and talents are valued and utilized*. A similar decision was made to select belongingness items from Chung et al.'s (2020) work, in which the authors used the highest loaded factors: *A. I am treated as a valued member of my work group*; *B. I belong in my work group*; *C. I am connected to my work group*. While the metrics used for stress and depression have a clinical connotation related to a person's health, psychological safety and belongingness address elements related to team work, respect, and inclusion.

Table 1: Selected Survey Questions

Question	Statements
Stress (After Solomon et al., 2022)	
2.1. How much do you agree with the following statements? (Likert scale 5-point: Strongly Disagree to Strongly Agree)	A. My job is more stressful than I had ever imagined. B. I fear that the amount of stress in my job will make me physically or mentally ill.
Depression (After Kroenke et al., 2007)	
2.2. Over the last month, how often have you been bothered by the following problems? (Scale: 1=not at all, 2=several days, 3= more than half days, 4=nearly every day).	A. Little interest or pleasure in doing things. B. Feeling down, depressed, or hopeless.
Belongingness (Reference: Chung et al. 2020)	
2.3 Please indicate the degree to which you personally agree or disagree with each of the following statements about the work group in which you work (Likert scale 5-point: Strongly Disagree to Strongly Agree):	A. I am treated as a valued member of my work group. B. I belong in my work group. C. I am connected to my work group.
Team Psychological Safety (After Edmondson 1999, New reference for 4 statements only, work based on Edmondson 1999: Madrid et al. 2024 1: strongly disagree to 5: totally agree)	
3.1. Rate your agreement with the following statements (Likert scale 5-point: 1: Strongly Disagree to 5: Strongly Agree)	A. It is safe to take a risk on this team (R) B. Members of this team are able to bring up problems and tough issues C. No one on this team would deliberately act in a way that undermines my efforts D. Working with members of this team, my unique skills and talents are valued and utilized

RESEARCH METHOD

The results presented are part of an ongoing project investigating Lean Construction tools and practices and the mental health of construction workers. This paper reports on the data collected and analyzed, up to the point when this paper was written, regarding the measures related to mental health only. The goal of the authors is to share the results obtained so far with the Lean Construction community and start a discussion on the current state of construction workers mental health using data collected in the United States.

The project was originally approved by the board of directors of the funding organization (Lean Construction Institute), which deemed the topic of high relevance for the Construction industry in the United States and later awarded the funds to the first two authors (principal investigators - PIs) of this paper to conduct the study. The funding organization requested that the study should be focused on the current conditions facing the industry in the United States.

This is a limitation of the current study in terms of the professionals involved and the data collected; however, the method used to collect data, and the discussion presented can be used to study other populations.

The study, up to the stage discussed in this paper, was developed considering multiple approaches, as described in this section, including meetings with an industry advisory board, review of the literature, and development of a survey. The PIs submitted the study for review by the Institutional Review Board (IRB) of San Diego State University (SDSU), which considered the study to be exempt and approved the documents developed in August of 2024. The details of the research method are presented below.

ADVISORY BOARD (AB) MEETINGS

Considering that this project is currently being funded by the Lean Construction Institute, and the importance of collaborating with industry professionals to support external validity (Lucko and Rojas 2010), the team engaged an industry advisory board (AB) to support the research team and focus the study on pressing issues faced by the industry.

The AB included representatives from various organizations in the industry in the United States (i.e., funding organization (1), construction management consulting (2), architecture (2), general contractor (1), specialty contractor (1), insurance (1)). All board members have over ten years of working experience in Lean Construction and interaction with construction workers. These individuals were invited to participate in the AB due to their strong involvement in other initiatives related to construction workers mental health supported by the funding organization, their own organizations, and the industry at large in the United States.

In total, the group met in five different occasions from March 2024 through May 2024. In the first meeting, the PIs presented the goals of the study and expectations, including the goal to develop a survey to investigate the topic, and discussed pressing issues currently affecting CWMH. The following three meetings were dedicated to an interactive process to identify areas considered relevant to the AB members, framing and reviewing questions related to the topic being studied. The fifth and final meeting was devoted to presenting the final questions selected to be part of the survey, which is described in more detail later in this section.

LITERATURE REVIEW

The literature review started late in 2023, and before the first meeting with the AB, and continued throughout 2024. In the early stages of the study, the team focused on reviewing studies related to mental health and well-being of construction workers in general, and collecting statistics related to these topics in the construction industry. The topics covered included scientific papers, Government-published reports, and programs available in the construction industry.

As the AB meetings continued from March to May of 2024, the PIs engaged an Organizational Management Professor, Amy Randel (Professor of Management, SDSU) to guide the team on specific literature with validated measures and scales relative to the study of mental health and well-being in other industries. Dr. Randel served as a research consultant and helped the team to select questions that had already been used in previous studies, instead of developing new measurements. The goal was to make the results of this project aligned with the published literature to facilitate comparison across other industries.

SURVEY DEVELOPMENT AND DISTRIBUTION

Considering the information collected from the literature review, the input of the AB and the consultant, the team developed a survey submitted to the IRB. The survey was initially developed in English and later translated with the support of a native Spanish speaker, Professor Lorena Carina Broca Dominguez from Universidad LaSalle, Oaxaca, who has a construction-

related background and discussed the meaning and intent of each question with the first author of this paper.

The survey started with an informed consent statement, followed by screening questions related to age (18 years or older), workers in occupations targeted by the survey, and a brief description of terms used in the survey (e.g., forepersons and superintendents). The consent and screening parts were followed by: Part 1: Background information (demographics questions, shown in Table 2); Part 2 – Mental health measures (Stress, Depression, and Belongingness shown in Table 1); Part 3 – Psychosocial safety climate, collective decision making, action; and Part 4 – Lean practices (questions related to clear directions given to workers and Lean practices and tools). The items and statements related to Parts 1 and 4 were more heavily influenced by the AB, whereas the measures and statements of parts 2 and 3 were more influenced by the literature reviewed and the advice of the research consultant. The AB had very specific comments regarding what types of demographics should be collected by the team and which Lean practices should be included in the study. At the end, the PIs had to trim the long list of survey questions requested by the AB and leave the ones that the PIs decided based on previous studies should be considered to avoid fatigue as respondents answered the survey.

The survey was distributed with the assistance of the AB members, the funding organization, construction industry associations, and PIs’ professional connections, which are located throughout United States. They are in contact with a large number of construction contractors, construction management companies, and owner or owner’s representatives. The survey was open in August 2024 and expected to complete in March 2025. The project manager(s), forepersons, and workers from the companies had the option to volunteer to take the survey. By the end of 2024, a total of 151 usable responses were obtained. There were 101 responses that were not used in the analysis because they were either incomplete or the responses took very short time to complete the survey.

This paper mostly addresses results of Parts 1 and 2, and some of Part 3 based on the 151 usable responses, given the space available in a single conference paper.

Table 2: Selected Questions from Part 1 – Background Information

Question
1.4. What is your primary construction trade? a. Piping/plumbing, b. Steel, c. Mechanical/HVAC, d. Roof, e. Drywall/Masonry, f. Electrical, g. Earthwork/Highway/Road building, h. Concrete, i. Other (please specify).
1.5. How many years of work experience do you have in construction? A. Between 1 and 5 years, B. More than 5 years but less than 10, C. More than 10 years but less than 20, D. Above 20 years
1.6. How do you identify your gender? A. Male. B. Female, C. Non-binary/Other, D. Prefer not to say.
1.7. With which racial and ethnic groups do you identify? Please select all that apply: A. American Indian or Alaskan Native, B. Asian, C. Black or African American, D. Hispanic or Latinx, E. Middle Eastern or North African, F. Native Hawaiian or Pacific Islander, G. White, H. Prefer to self-describe: _____, I. Prefer not to say.

DATA ANALYSIS

Considering that the data collection was still in progress at the time this paper was developed, the authors decided to share results related to the frequency distribution of the responses, but avoided to discuss additional analyses to be developed using the survey data.

RESULTS AND DISCUSSION

This section presents the results obtained from 151 respondents regarding the questions selected by the authors.

DEMOGRAPHICS

The 151 survey responses obtained from the United States came primarily from Ohio, California, Michigan, and Texas (at least 10 responses each). Respondents work in Piping and Plumbing (about 27.8%, 42 respondents), Mechanical and HVAC (19%, 29), Earthwork/Highway/Road building (10%, 16), Other-General Contractor self-identified (11%, 18), Other-Construction Manager self-identified (6%, 9), and Concrete (5%, 3). Regarding race, the overwhelming majority (80%, 122) of the respondents identify as White, and about 7% (10) as Hispanic or Latinx, a few respondents selected multiple races as allowed by this question. Similarly to the make-up of race, the overwhelming majority identify as Male (83%), followed by about 15% (22) Female. Regarding the respondents' work experience, the majority (about 40%, 60) indicated that they have between 1 and 5 years of work experience in construction, followed by 23% (35) with over 20 years, 22% (33), between 10 and 20 years, and 15% between 5 and 10 years.

As a result, this group of respondents is composed mostly of White males, with 45% of them being in the industry for over 10 years. This is important in the context of this work considering that despite the fact that the survey was developed in both English and Spanish, to address the large number of Hispanic or Latinx in the industry, they are not properly represented in the sample. According to the United States Bureau of Labor Statistics (2022), Hispanics represent about 30% of the construction industry (compared to 17.6% employed in the industry at large) whereas Female workers are 10% of the construction workforce, as such, Hispanics are underrepresented in the current sample whereas Females are slightly above the construction industry numbers.

STRESS

Results presented in Figure 1, indicate that about 40% of the survey respondents 'agree' or 'strongly agree' that their work is more stressful than they ever imagined, in addition to 40% who are undecided about the nature of their work. Where 35% fear that the amount of stress in their job will make them physically or mentally ill, with 31% undecided in this category.

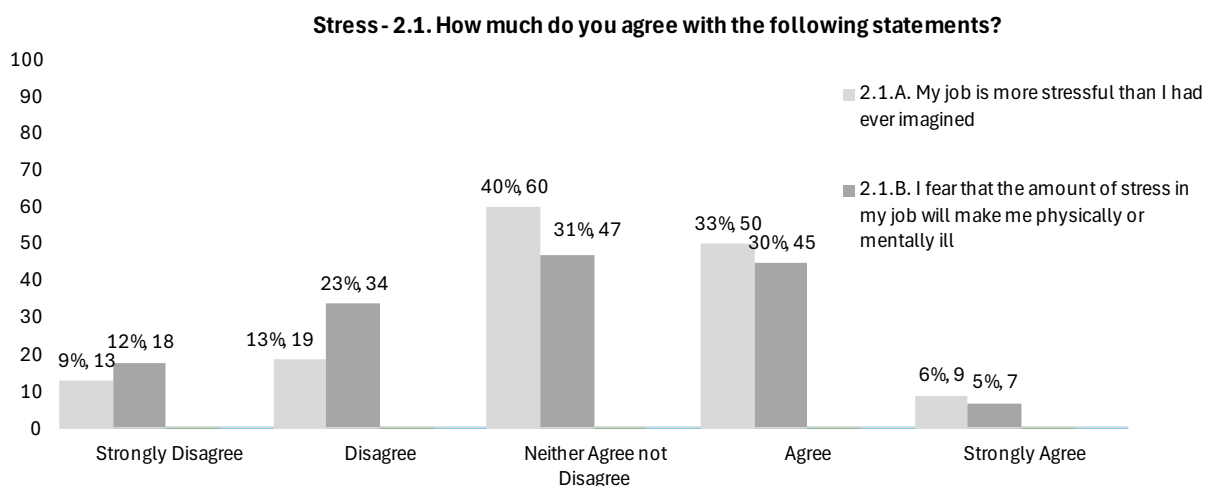


Figure 1: Stress

Figure 1 shows that 1 in 3 of the individuals surveyed indicate that they are working under very stressful conditions, which are common in construction projects but, as results show, these conditions might be leading respondents beyond their breaking point.

DEPRESSION

Regarding the questions related to depression, Figure 2 illustrates that over half of the respondents (57%) indicated that they have had little interest or pleasure in doing things over the past month ranging from at least several days (30%) through nearly every day (10%). Regarding feeling down, depressed, or hopeless, 51% indicated that they have not experienced this problem over the last month, but again the other 49% answered that they have felt this way at least several days a month. The data indicate that half of the respondents appear to experience depression-related symptoms over the past month.

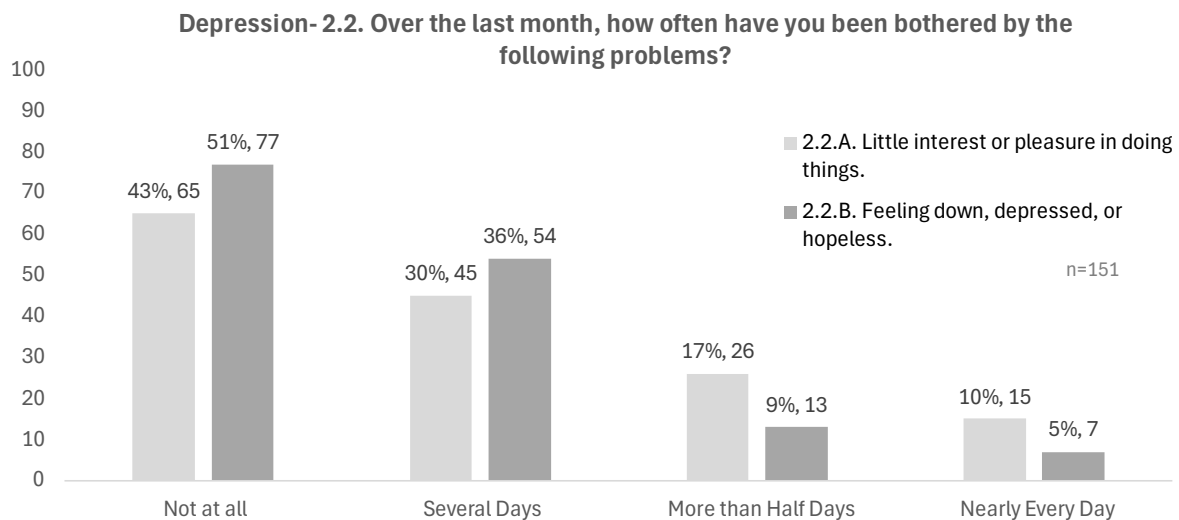


Figure 2: Depression

BELONGINGNESS

The measures associated with belongingness in the work space indicate that respondents for the most part agree with all three statements employed to measure the degree of belongingness they experience at work (Figure 3).

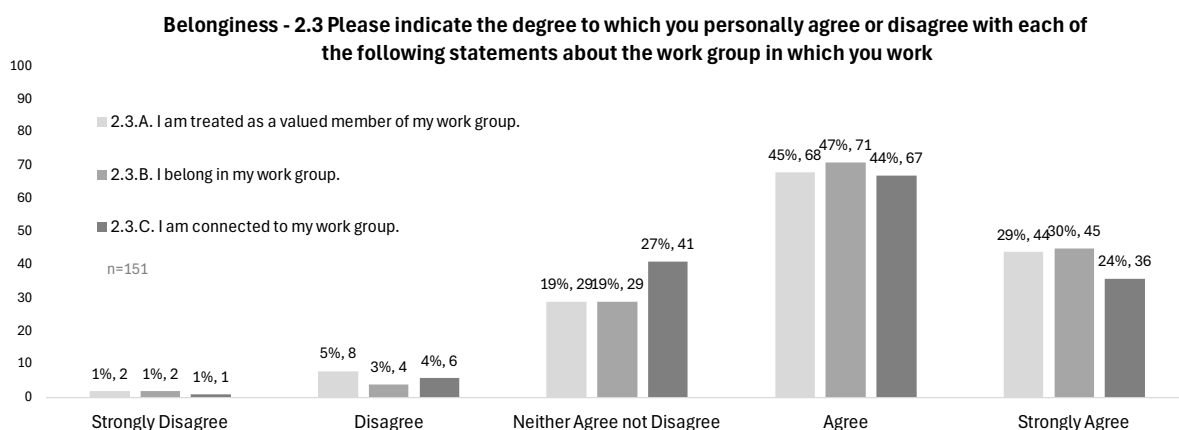


Figure 3: Belongingness

Figure 3 shows that 74% of respondents answered that agree or strongly agree that they are treated as a valued member of their work group, whereas 77% indicated that they belong to their work group and 68% indicated that they believe that they are connected to their work group. This result is encouraging as respondents perceive that they belong to the teams they work with.

TEAM PSYCHOLOGICAL SAFETY

Team psychological safety has been explored in the Lean Construction literature as an important component to support team learning behavior (Häringer et al. 2024) as well as making reliable promises, active listening, and better team performance in a global virtual team in construction (Gomez Villanueva et al. 2024). Figure 4 reveals that 43% respondents agree or strongly agree that it is safe to take risks as part of their team, whereas 71% indicate that they are able to bring up problems and touch issues as part of their work with their teams. However, 57% and 28% either neither agree nor disagree, disagree, or strongly disagree with the statements in Figure 4, revealing some room for improvement as far as helping teams feel that their comments, even the ones about tough issues, are welcome by the team.

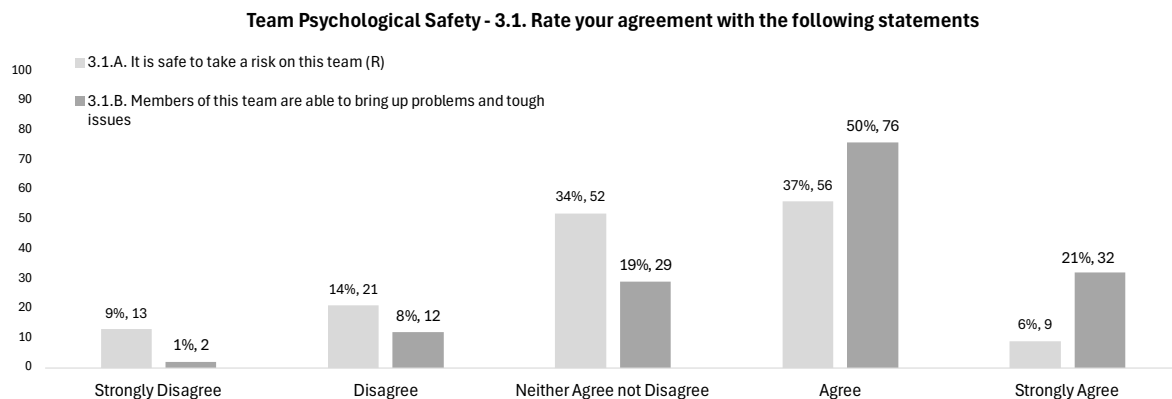


Figure 4: Team Psychological Safety – 3.1.A and 3.1.B

Figure 5 reveals the additional results used as proxy for Team Psychological Safety, as 56% either agree or strongly agree with the statement indicating that ‘no one on this team would deliberately act in a way that undermines my efforts’ and an even higher number of agreement (74%, agree and strongly agree) was observed for ‘working with members of this team, my unique skills and talents are valued and utilized’.

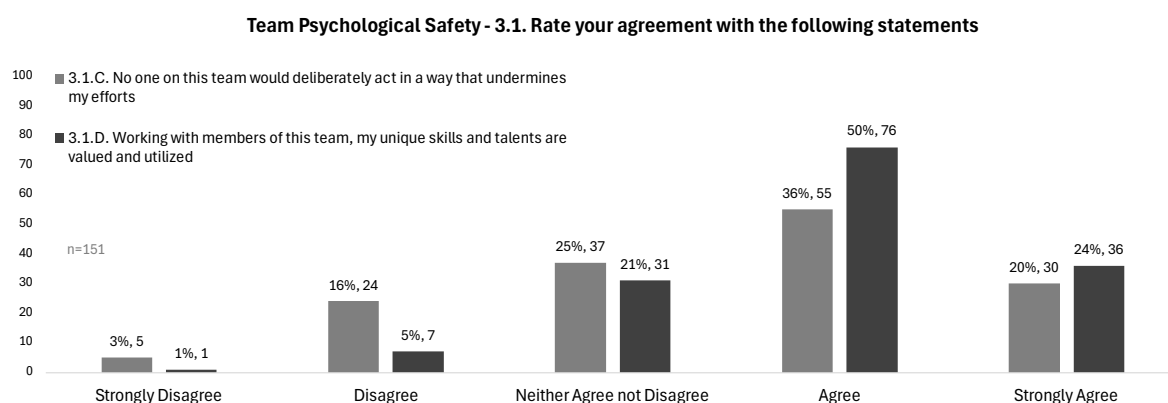


Figure 5: Team Psychological Safety – 3.1.C and 3.1.D

Results in Figures 4 and 5 are in line with those obtained by Häringer et al. (2024) which revealed that individuals indicated to feel psychologically safe in the industry, but also acknowledging that there is room for improvement.

CONCLUSIONS

Based on the national survey of the United States investigating CWMH, we have two main findings regarding stress, depression, belongingness, and psychological safety. The overall status of stress and depression is concerning: (1) About 40% of the survey respondents agree 'or strongly agree' that their work is more stressful than they ever imagined, (2) 35% fear that the amount of stress in their job will make them physically or mentally ill, (3) 57% indicated that they have had little interest or pleasure in doing things over the past month ranging from at least several days to nearly every day, and (4) 49% answered that they have felt down, depressed, or hopeless at least several days a month. The proximal cause can be physically demanding work, long work hours and commute time, pressing deadlines driven by a tight schedule, the tough 'can-do' culture in construction projects, etc. In-depth analysis is needed to investigate the specific causes and quantify the impact of problems faced by construction workers. It is concerning to observe the deteriorating mental health of construction workers, and the resulting numbers of fatalities in the industry. This calls for urgent attention from all construction practitioners to take action to address the problem.

In this regard, Lean Construction academics and practitioners are well positioned to engage in discussions and offer solutions which can leverage the use of tools that support workers' engagement to participate in the planning of tasks, and autonomy to feel in control of the work they develop. Construction workers and those in the industry are proud of the work they accomplish and, as indicated by respondents, display a strong sense of belonging to their work groups. Over 68% of the respondents agree with all three statements measuring the degree of belongingness. The perception of psychological safety is satisfactory overall but also acknowledging that there is room for improvement. As the research team continues to gather additional data, a comprehensive analysis will be undertaken to explore the underlying causes of these issues and to develop construction management strategies to improve CWMH.

However, the AB for this study questioned the partial results related to psychological safety due to the large numbers of undecided respondents, which when added to those disagreeing and strongly disagreeing with the statements, vary from 27% (*Working with members of this team, my skills are valued and utilized*) to 57% (*It is safe to take risks on this team*). The AB believes that these results suggest that more needs to be done to create welcoming environments in construction projects. To further investigate the quantitative results of this study, the authors plan to interview construction workers and collect examples of elements that might influence CWMH in construction projects. Additionally, the study when completed will shed light on how the use of Lean tools affects CWMH, which is currently a topic that needs more investigation. Despite claims that Lean tools support better work environments in construction, the claims often rely on anecdotal evidence, with some studies collecting qualitative and quantitative data to support claims, as discussed earlier in this paper. Research is needed to address this gap in the Lean Construction literature and that related to CWMH.

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REFERENCES

- Associated General Contractors of America (AGC) (2025). *Culture of CARE*. Retrieved from <https://buildculture.org/> on 01/16/2025
- Chung, B. G., Ehrhart, K. H., Shore, L. M., Randel, A. E., Dean, M. A., and Kedharnath, U. (2020). Work Group Inclusion: Test of a Scale and Model. *Group & Organization Management*, 45(1), 75–102. <https://doi.org/10.1177/1059601119839858>
- Edmondson, A. (1999). Psychological Safety and Learning Behavior in Work Teams. *Administrative Science Quarterly*, 44(2), 350–383. <https://doi.org/10.2307/2666999>
- Fauchier, D. and Alves, T. C. L. (2013). Last Planner® System Is the Gateway to Lean Behaviors, *Proc. 21th Annual Conference of the International Group for Lean Construction*, 559-568.
- Fischer, M. , Reed, D. , Khanzode, D. A. & Ashcraft, H. (2014). A Simple Framework for Integrated Project Delivery, *22nd Annual Conference of the International Group for Lean Construction*, 1319-1330.
- Häringer, S. , Gomez, S., and Schöttle, A. (2024). An Investigation of Psychological Safety in Construction Projects and Its Influence on Team Learning Behaviour: A Survey-Based Study, *Proceedings of the 32nd Annual Conference of the International Group for Lean Construction (IGLC 32)* , 1123-1134. doi.org/10.24928/2024/0150
- Gomez Villanueva, S., Ballard, G., Terni, S., Arroyo, P., and Bello, K. (2024). An Exploration of Psychological Safety and Team Behaviors in a Construction Global Team. In D. B. Costa, F. Drevland, & L. Florez-Perez (Eds.), *Proceedings of the 32nd Annual Conference of the International Group for Lean Construction (IGLC32)* (pp. 1111– 1122). doi.org/10.24928/2024/0130
- Harris W, Trueblood AB, Yohannes T, Rodman CP, and Rinehart R. Suicides among construction workers in the United States (2021). *Am J Ind Med*. 2024;1-8. [doi:10.1002/ajim.23632](https://doi.org/10.1002/ajim.23632)
- Kroenke, K., Spitzer, R. L., Williams, J. B. W., Monahan, P. O., and Löwe, B. (2007). Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection. *Annals of Internal Medicine*, 146(5), 317–325. <https://doi.org/10.7326/0003-4819-146-5-200703060-00004>
- Lean Construction Institute (2025). *Respect for People*. Retrieved from <https://leanconstruction.org/lean-topics/respect-for-people/> on 01/16/2024
- Lucko, G. and Rojas, E.M. (2010). Research validation: challenges and opportunities in the construction domain, *J. of Construction Engineering and Management*, 136(1) pp.127-135
- Madrid, H. P., Vasquez, C. A., & Escaffi-Schwarz, M. (2024). Leader affective presence, psychological safety and team proactive problem prevention. *Journal of Occupational and Organizational Psychology*, 97(2), 516–535. <https://doi.org/10.1111/joop.12480>
- Nolan, M. T., Diefendorff, J., Erickson, R. J., & Lee, M. T. (2022). Psychological compassion climate: Examining the nomological network of perceptions of work group compassion. *Journal of Vocational Behavior*, 133, 103688-. <https://doi.org/10.1016/j.jvb.2021.103688>
- Tijani, B., Falana, J. N., Jin, X., & Osei-Kyei, R. (2023). Suicide in the construction industry: literature review. *International Journal of Construction Management*, 23(10), 1684–1693. <https://doi.org/10.1080/15623599.2021.2005897>
- Peinado, H. S. and Costa, D. B. (2023). Worker Involvement Strategies in Construction: Insights From the Lean Literature, *Proceedings of the 31st Annual Conference of the International Group for Lean Construction (IGLC31)* , 905-916. doi.org/10.24928/2023/0160
- Schöttle, A. (2020). What Drives Our Project Teams?, *Proc. 28th Annual Conference of the International Group for Lean Construction (IGLC)*, 313-324. doi.org/10.24928/2020/0094

- Solomon, B. C., Nikolaev, B. N., Shepherd, D. A., & Eby, L. T. (2022). Does Educational Attainment Promote Job Satisfaction? The Bittersweet Trade-offs Between Job Resources, Demands, and Stress. *Journal of Applied Psychology*, 107(7), 1227–1241.
- U.S. Bureau of Labor Statistics (2022). *The Construction Industry: Characteristics of the Employed, 2003–20*. Retrieved from: <https://www.bls.gov/spotlight/2022/the-construction-industry-labor-force-2003-to-2020/> on 01/19/2025
- U.S. Bureau of Labor Statistics (2024). *Census of Fatal Occupational Injuries Summary, 2023*. USDL-24-2564. Retrieved from: <https://www.bls.gov/news.release/cfoi.nr0.htm> on 01/15/2025
- Workplacementalhealth.org (2021). Pulse Survey Report. Retrieved from <https://workplacementalhealth.org/getmedia/f59c14bc-684c-40bf-8c05-ea958c321bbc/Mental-Health-and-Well-being-in-the-Construction-Industry> on 01/15/2025