



# The Impact of COVID-19 in the A/E/C Industry

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## Abstract

The project establishes a guide that will aid the A/E/C industry in implementing organizational change during times of adversity, such as what is being experienced due to the COVID-19 pandemic, in order to create a proactive approach to problems rather than being reactive. It outlines means and methods implemented by the Coffman Engineers (Honolulu Office) organization that established a beneficial position when dealing with uncertainty. Industry innovative systems and technological advancements are outlined with the importance of implementing diversity in A/E/C organizations and establishing a strong resilient culture foundation to attain a profitable change.

## Introduction

The purpose of the project is to assess the impact that was observed in 2020 and 2021 due to the pandemic that was experienced worldwide; specifically for the A/E/C industry and within the Coffman Engineers company (Honolulu Office). The project explored both the negative and positive impacts/outcomes from the unprecedented challenges experienced by reason of the COVID-19 pandemic.

## Background

Construction was and still is characterized as an essential business, which bolsters the probability of a beneficial organizational outcome by establishing continuous labor and positive income, but it also encompasses the importance of being able to refer to standardized safety guidelines when conducting such work amidst the extent of the pandemic. The most recent guidelines for construction specific recommended practices, published by the Associated General Contractors of America (AGC) and the Occupational Safety and Health Administration (OSHA), can establish a basis of approach which can be applied for most construction industry related labor activities, understanding that there are cases in which certain guidelines may not be considered as a one size fits all.

## Problem

The construction industry constitutes about 13% of the global gross domestic product and it is anticipated to grow by more than 70% worldwide by 2025; for the U.S. it accounts for about 4.7% of the total national employment, but this past year caused for 20% of organizations to have withdrawn offers to entry-level employees, 14% faced potential contract penalties due to project delays, and 40% of construction firms were forced to lay off workers because of project cancellations and shortages of equipment and materials. According to the survey studies conducted by the American Society of Civil Engineers (ASCE), 14% of organizations had an employee with COVID-19 as of March 18, 2020, the rate climbed to 22% by April 9, 2020, and then increased to 25% by May 26, 2020. Also, a majority of 63% of organizations expressed that work from home and social distancing measures were deemed necessary [1].

## Methodology

Two approaches were considered when determining the project's data collection; a quantitative approach of obtaining systematic and financial data from the Coffman Engineers (Honolulu Office) fiscal year performance, and a qualitative approach which focused on obtaining in-house related data on management practices and office culture impact. Due to the considered timeframe of the objective topic, constantly updated information, and the lack of available publications; a third approach surfaced during the course of the project. The third approach was carrying out extensive research with the objective of acquiring the most up-to-date and relevant information.

Figure 1 indicates the company wide net revenue for the FY19 showing a total amount of \$92,784,466; also, it displays a predicted net revenue value of \$102,453,464 for the FY20. Even with an already perception of growth and without taking any adversity into account, the predictive value for FY20 reported on the annual report for FY19 was surpassed. The annual report for 2020 indicated a net revenue value of \$103M, showing a 12% increase from the previous year's performance. The data showed that Coffman Engineers exceeded its own expectations which further indicate effective implementation of industry's best practices, impacts, and research directions. Figure 2 presents the data of the support software, Microsoft Teams, for the FY20. The Teams stats embody data towards favorable productivity rates, market expansion, stakeholder involvement, organizational exposure, collaborative approach, and flexible working conditions.

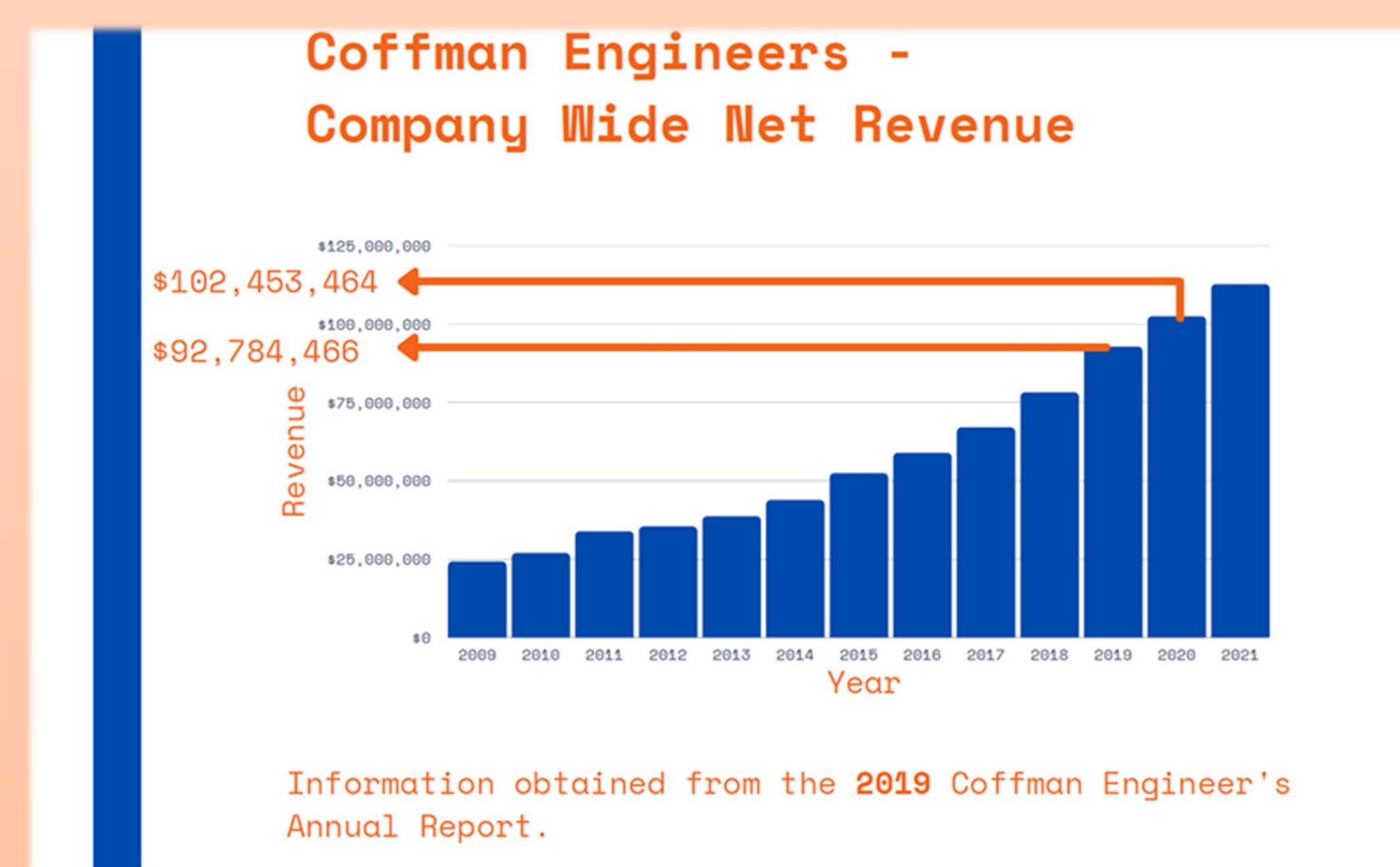


Figure 1  
Coffman Engineers – Company Wide Net Revenue



Figure 2  
Coffman Engineers – Microsoft Teams Stats

## Results and Discussion

A clear indicator of why Coffman Engineers (Honolulu Office) succeeded in overcoming adversity, other than its managerial intuitive decision making, is the serviced market sectors and funding sources. Figure 3 displays the way these are sorted and can be a good index of which markets to pursue but, it needs to be adjusted as the industry presents shifts.

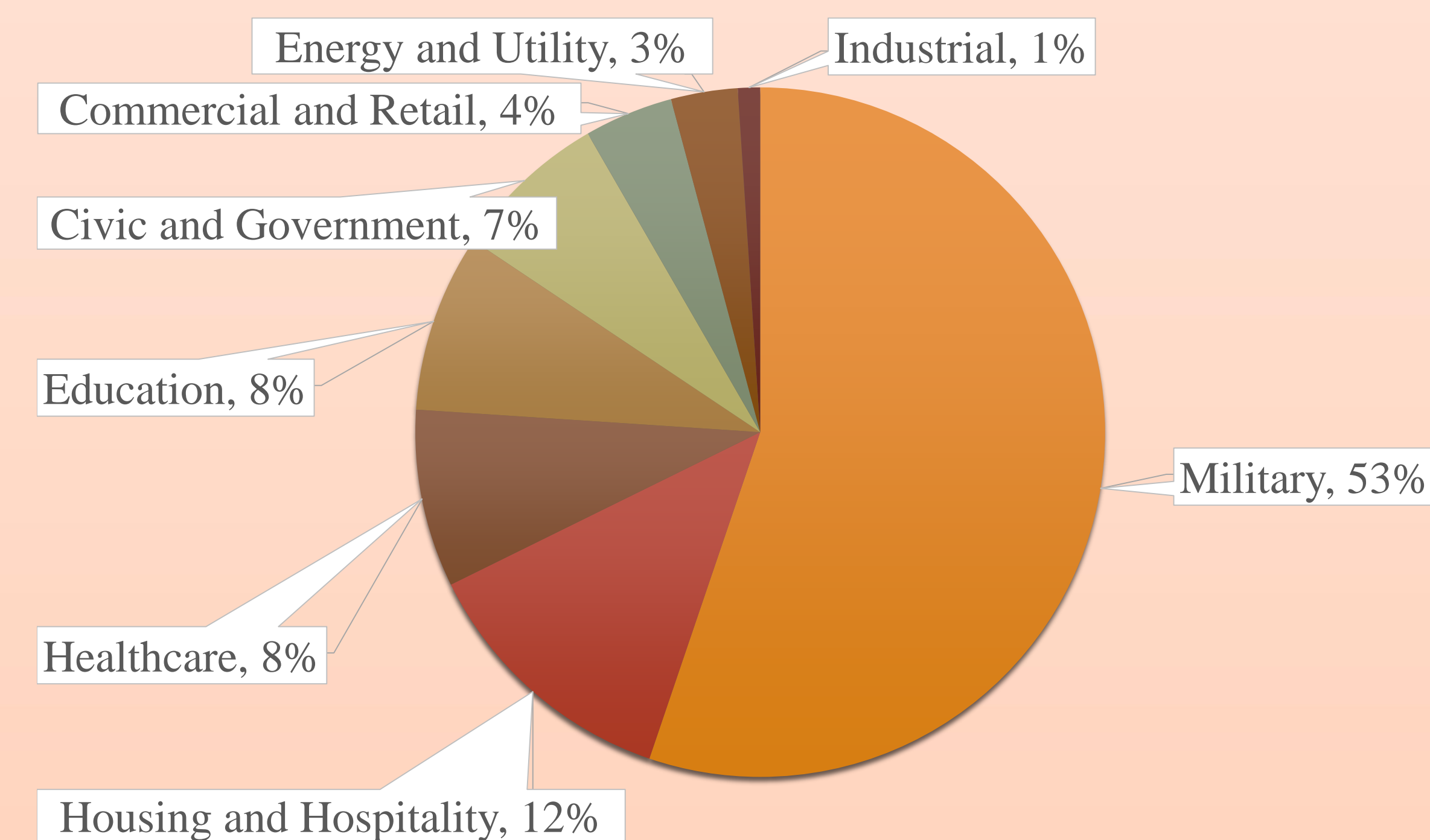


Figure 3  
Coffman Engineers (Honolulu Office) – Market Sectors

Introduction of tools and services such as the Pedestrian Simulation Modeling (PSM), as seen in Figure 4, led by the Fire Protection engineers, capitalize on the diversity of the Coffman's business strategy. PSM, as used by the life safety team, can identify and confirm how social distancing practices can be achieved by replicating the built environment and developing digital models that replicate best practices such as crowd spacing control, screening, one-way directional travel, and other measures used to satisfy business needs and promote reopening practices that are both feasible and effective [2]. Two indicators of this strategy within Coffman, in addition to the previously mentioned PSM, are Alternative Energy and Performance Based Design (PBD). The PBD encompasses out of the box engineering approaches with the intent of rethinking design concepts and achieving project goals through distinct methods.



Figure 4  
Coffman Engineers – Company Wide Net Revenue

## Conclusion

The project was able to establish a strong connection of importance in developing effective Virtual Enterprise (VE) systems, which is why the introduction of managerial software tools such as Microsoft Planner was introduced on a discipline basis for the Coffman Engineers (Honolulu Office). "Digitalization defines how digital technologies, or IT can be utilized to change current business processes. In digitalization, IT serves as a crucial enabler to seize new business possibilities by changing current business activities, such as business relationship management, communication or distribution" [3]. Figure 5 presents an example of how the system is being adopted and the data that can be obtained from it.

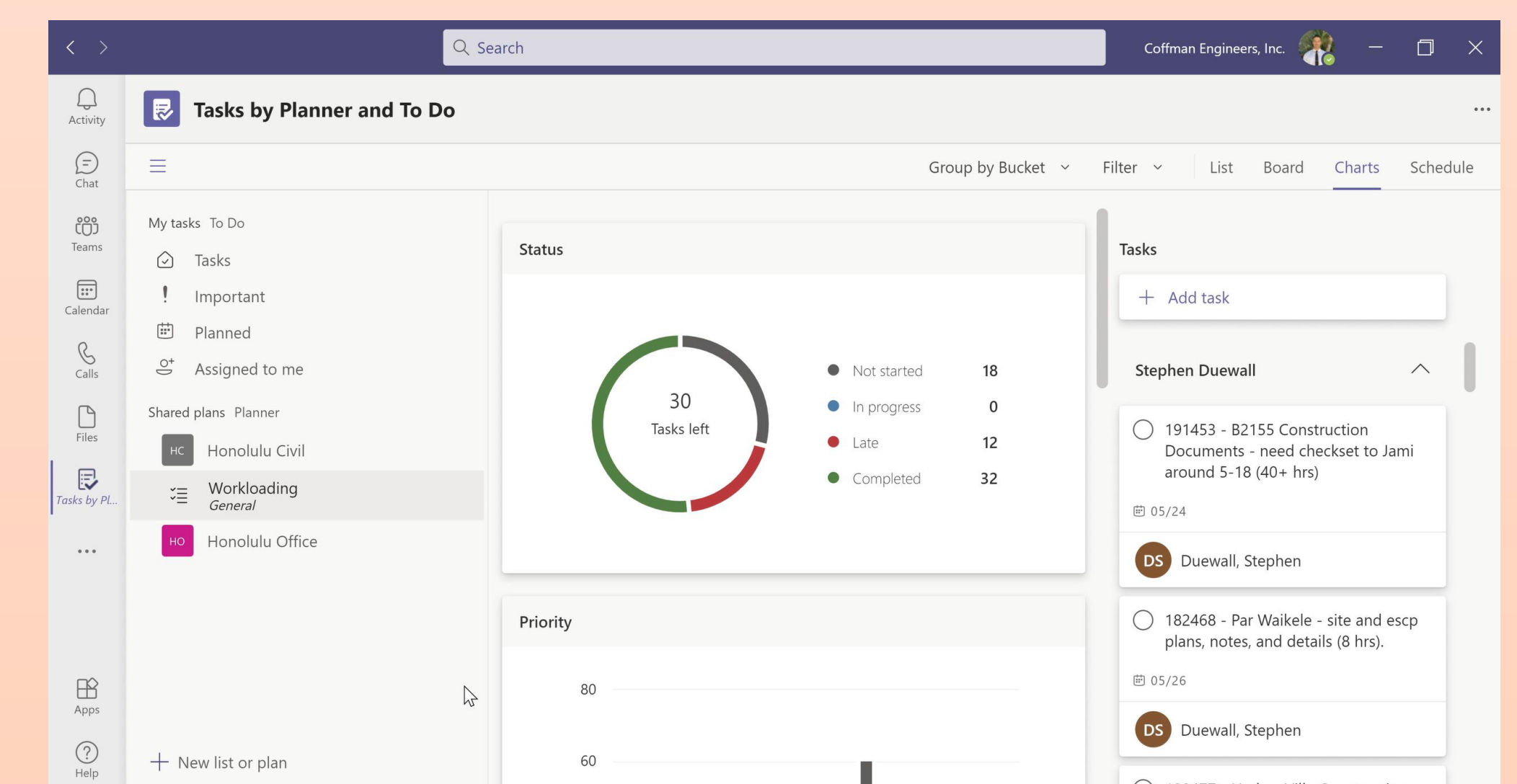


Figure 5  
Tasks by Planner and To Do – Civil Engineering Dept.

## Future Work

Recommendations for future research include the development of organizational teams with the purpose of pursuing a desired market and implementing tools and techniques that will aid in acquiring the sector, reporting should heavily consider the rate of return in pursuing such actions.

## References

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- [3] Bokolo Anthony Jnr & Sobah Abbas Petersen (2020): Examining the digitalisation of virtual enterprises amidst the COVID-19 pandemic: a systematic and meta-analysis, Enterprise Information Systems, DOI: 10.1080/17517575.2020.1829075