WORKtoZERO

an nsc program

Safety Innovation Challenge: Mitigating Work at Height Risks Through Computer Vision Technology

Executive Summary

In 2021, Work to Zero and SafetyTech Accelerator launched a pilot program designed to help small to medium-sized companies trial and adopt safety technologies. The first "Safety Innovation Challenge" focused on identifying innovative solutions capable of preventing or mitigating serious injuries, illnesses and fatalities (SIIFs) associated with working at height.

For this pilot, Service Center Metals (SCM), an aluminum extrusion and billet company, began working with Matroid, Inc. a U.S.-based provider of advanced computer vision software. Matroid's technology was leveraged within SCM's shipping and receiving docks to monitor and detect damaged, under-inflated or missing safety airbags, which were put in place to break potential falls during the loading process.

Key Findings:

1. Preliminary results indicate computer vision may be a viable tool for the early detection of critical safety risks, including those associated with work at height. Throughout the pilot period, Service Center Metals realized significant improvements in airbag compliance rates, from an initial average of 25% to consistently exceeding 90% compliance daily.

2. Key barriers associated with the adoption of computer vision into the workplace included project delays, resource constraints, communication challenges, employee buy-in and assessing the return on investment (ROI).

3. Piloting technology necessitates comprehensive planning and should be approached as an ongoing, iterative process of continuous improvement.

4. Formal and informal communication strategies, along with transparency and openness with employees, can help streamline the pilot process, gather valuable feedback and promptly address questions or concerns.

Introduction

Safety Innovation Challenge: Work at Height

In 2021, Work to Zero and Safetytech Accelerator, the first fully dedicated technology accelerator focused on advancing innovation in safety critical industries, announced a partnership to help small to medium-sized companies trial and adopt safety technology. The first Safety Innovation Challenge focused on identifying solutions with the potential to prevent injuries associated with working at height, a leading cause of SIIFs in the workplace (Work to Zero, 2020).

In 2021, falls from height contributed to 645 fatal workplace injuries, about 14% of total workplace fatalities (Bureau of Labor Statistics, 2022).

In 2022, Work to Zero and Safetytech Accelerator hosted a technology showcase, featuring six technology companies competing to be involved in the program. The participating companies were HausBots, a U.K.-based robotics company; drone makers Upteko from Denmark and Prenav from the U.S.; Matroid, a U.S. company specializing in software for building, deploying and managing computer vision detectors; Newmetrix, a U.S. construction analytics company; and IronYun, a U.S. video analytics company.

Following the showcase, Service Center Metals (SCM), a mid-sized aluminum extrusion and billet company based in Virginia, expressed interest in participating in the pilot project to mitigate work from height risks in its shipping and receiving docks. Ultimately, it was selected as the participating employer. After a thorough evaluation of each technology's capabilities, Matroid was ultimately selected as the participating vendor, with SCM finding its solution to be best suited to the company's specific requirements and safety objectives. In exchange for their participation, both companies received financial compensation to cover expenses incurred during the project.

Pilot Overview

Service Center Metals partnered with Matroid to detect the presence of safety hazards related to working at height, specifically within its shipping and receiving docks. During the loading process, metal is bundled together and lifted onto flatbed trucks using crane-mounted slings. On average, workers climb onto and off of the trucks 12-14 times per hour to inspect and reposition the metal, oftentimes working at heights of up to ten feet (see Figure 1). To mitigate fall hazards, workers undergo regular safety training, and airbags were installed in the docks to break potential falls and minimize injuries.

However, according to the SCM project lead, the leadership team faced challenges prioritizing airbag safety. SCM quantifies "airbag compliance" as the proportion of time the airbags are appropriately inflated, and before the pilot, it often struggled to maintain compliance rates above 25% a day. Additionally, as worker goals are often tied to production and maximizing truck payload weight, underreporting was another barrier toward airbag compliance, where workers often delayed or forewent reporting for the sake of meeting production goals. Consequently, these inconsistencies compromised the safety controls and increased the risk of worker injuries during loading operations.

WARNING: Employee working at height near missing airbag

Figure 1. Reproduced with permission from https://www.matroid.com.

To address these concerns, SCM implemented Matroid's computer vision technology to proactively detect critical safety issues. SCM's pre-existing loading bay cameras were integrated into Matroid's software platform, and a custom computer vision detector was trained to detect damaged, under-inflated or missing safety airbags. When issues are detected, a series of progressive alerts immediately notify the EHS team and shift supervisors to stop operations and address the issue. To filter repetitive or unnecessary alerts, the system only alerts when a truck is also present in the loading bay (see Figure 2).

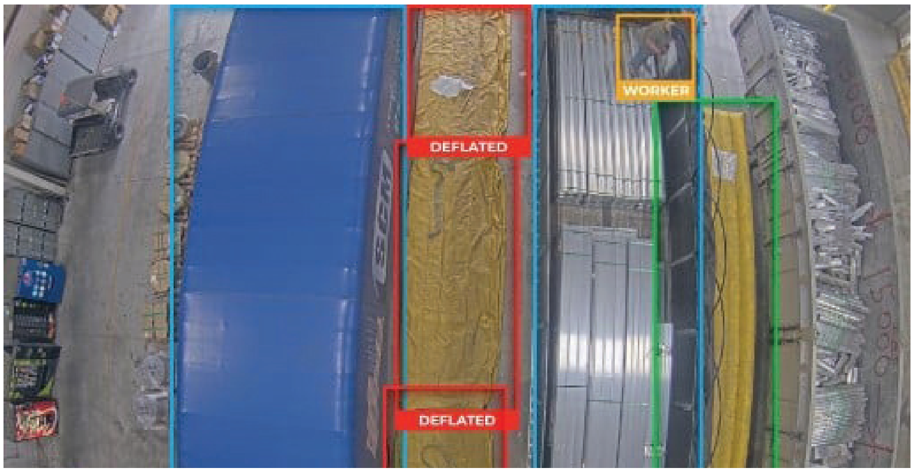


Figure 2. Matroid's computer vision platform can identify and alert for potentially damaged, deflated or missing airbags.

Objectives

This case study highlights the joint efforts of Service Center Metals and Matroid to improve workplace safety through innovation. The specific objectives are to:

1. Evaluate the applicability and effectiveness of computer vision technology for mitigating risks associated with working at height.
2. Understand the impacts of implementing computer vision technology on organizational and individual attitudes toward safety and innovation.
3. Identify the technical, operational or logistical challenges associated with deploying and integrating computer vision technology into the workplace.
4. Provide actionable recommendations based on the lessons learned during the pilot to refine future safety technology pilots and aid employers interested in deploying computer vision into their own workplaces.

Methodology

To achieve the project objectives, a mixed-methods approach was adopted. First, monthly interviews were conducted with a key EHS leader at Service Center Metals (hereby referred to as "SCM Lead"). These interviews gathered in-depth insights into the implementation process, challenges encountered and the impact of Matroid's computer vision system on workplace safety and culture.

Five months of safety observation data were provided by SCM, ranging from January to May of 2023. Information was collected on near misses, safe observations (instances where hazards were proactively identified and addressed), unsafe observations (instances where hazards were not addressed before posing an injury risk) and incidents where first aid was rendered.

The methodological framework also leveraged three distinct surveys. A pre-test survey was deployed to workers within SCM's shipping docks to establish a baseline understanding of safety perceptions and general worker attitudes toward safety technology. The post-test survey was deployed at the end of the pilot period, which was designed to measure changes in worker attitudes before and after the deployment of Matroid's technology. A third survey, deployed in both English and Spanish, was also administered company-wide to capture a holistic organizational perspective on the use of safety technology and computer vision across various departments and roles.

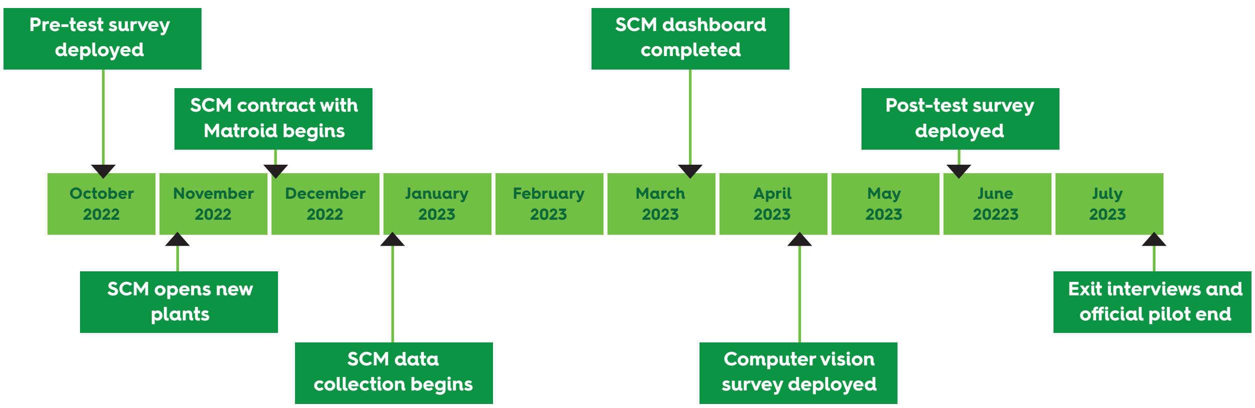


Figure 3. Project Timeline

Results

Technology Evaluation

In general, the partnership between Service Center Metals and Matroid was well-perceived in check-ins and interviews, with the SCM Lead calling the experience "overwhelmingly positive." It also demonstrates one potential use case for computer vision as a proactive safety detection tool. By tapping into the data provided by Matroid, SCM was able to build an internal dashboard to track the rate of inflated airbags (see Figure 4). The dashboard provides a quick, visual way for supervisors to track compliance with the airbags and proactively address maintenance issues before an incident occurs. The dashboard, along with progressive system alerts, helped bolster airbag daily compliance rates from an estimated rate of 25% per day, to regularly exceeding 90% daily compliance.

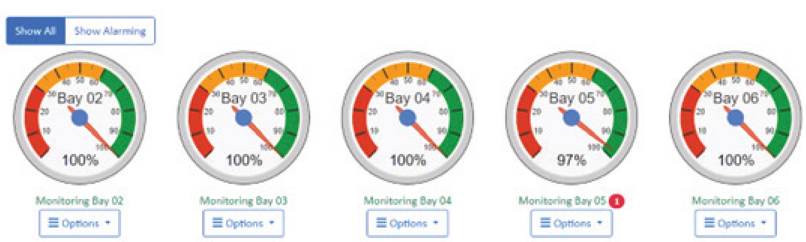


Figure 4. Example of SCM's Airbag Inflation Dashboard

There was also evidence that the implementation of computer vision helped drive worker compliance with airbag safety. During the pilot, SCM emphasized the importance of transparency with employees, including being open about the location of the cameras and the purpose of the system.

According to the SCM Lead, introducing workers to the system not only “tangibly enhanced safety” but also “positively impacted safety culture and worker behavior.” He noted that workers are more vigilant about proper airbag inflation, while supervisors are more diligent in enforcing safety protocols in the workplace. Thus, while the ultimate responsibility for worker safety rests with Service Center Metals, involving employees in the pilot process yielded additional unexpected benefits, positively influencing compliance with safety measures.

Another key benefit of computer vision on workplace safety was the additional availability and visibility into key safety metrics. Interestingly, unsafe observations in the shipping docks steadily increased during the pilot, up by 400% by the conclusion of the pilot (see Table 1). To better understand this trend, the SCM Lead collected feedback from managers and workers. One employee shared that by proactively addressing the deflated airbags, “[we] have more time to focus on other issues that need to be addressed that aren’t airbag related.” Another worker expressed the pilot helped them “reengage in safety.” Ultimately, the SCM Lead concluded that by streamlining airbag compliance, workers could divert their attention to other areas of safety. Consequently, this shift in focus led to the identification and reporting of additional safety concerns during the pilot period.

Table 1. Shipping Docks Safety Observations

Month	First Aid	Near Misses	Unsafe Observations	Safe Observations	Interactions (Total)
January	–	3	22	34	59
February	2	2	66	62	132
March	3	–	72	42	117
April	–	–	112	40	152
May	–	–	110	55	165

Organizational Readiness

A secondary objective of this case study was to understand the impacts of adopting computer vision technology on both the organization and its workers. In 2021, Work to Zero, in collaboration with DEKRA, developed a five-phase model to help employers determine their level of readiness to implement safety technology and provide tailored recommendations to improve to the next level. The five levels of digital readiness are:

1. **Observing:** Passive participation in exploring what and how technology is used for safety
2. **Experimenting:** Evaluating proof concept for specific safety use cases
3. **Adopting:** Investing in developing and acquiring technologies for safety
4. **Integrating:** Actively seeking out technologies to maximize value for safety
5. **Transforming:** Driving new innovations for safety (Work to Zero, 2021)

In October 2022, the SCM Lead was asked to complete the Digital Readiness Assessment to evaluate which phase he perceived the organization to be in. His results indicated they were in the **Adopting** phase. In this phase, investments are being made toward developing and acquiring skillsets and relevant technologies. A well-defined purpose for technology and safety is communicated and most people in the organization accept and support the use of safety technologies (Work to Zero, 2021).

Following the pilot process, he was asked to take the assessment a second time to determine if there were any changes to the perceived digital readiness of the organization. According to the results, SCM improved from **Adopting** to **Integrating**. In the integrating phase, there is a clear appreciation of the benefits safety technology can provide, principals of change management are used to manage any new vulnerabilities or risks, and the organization actively seeks out technologies and talents to maximize the value for safety (Work to Zero, 2021).

When asked specifically whether these results accurately reflect the pilot experience, the SCM Lead agreed the results were generally accurate and validated how leadership viewed the organization's digital readiness. While implementing Matroid's computer vision system, SCM made significant improvements – nearly doubling their IT team and improving their standard operating procedures. SCM also identified several future-state applications of computer vision, such as detecting fires or explosions and tracking PPE compliance. Overall, the partnership between Matroid and SCM appears to have bolstered SCM's overall readiness to innovate. SCM has agreed to extend Matroid's contract, setting the stage for a broader spectrum of future applications of technology in the workplace.

Employee Attitudes

Along with measuring organizational readiness, this pilot also aimed to better understand worker attitudes toward safety technology. At the start of the pilot period, a pre-test survey was deployed to workers within SCM's shipping docks to better understand their perceptions of safety and technology in the workplace. A second post-test survey was deployed to the same workers at the end of the pilot period. While the purpose of these surveys was to measure changes in worker attitudes before and after the pilot, small sample sizes (*n*=16 and *n*=6 respectively) restricted the ability to draw statistically meaningful comparisons. Nonetheless, the data did highlight several interesting trends in worker attitudes.

First, according to results from the pre-test survey, all responding managers or supervisors (*n*=6) either "somewhat" or "strongly" agreed that technology would help them carry out their safety-related projects. Of those, 83% "somewhat" or "strongly" agreed that technology will help increase overall organizational productivity. Workers and managers were also asked to rate their agreement with the statement *"I support the use of safety technology in the workplace."* According to these results, 90% of workers and 100% of managers either "somewhat" or "strongly" agreed with the statement, exemplifying a general willingness to trial and adopt new technologies to support workplace safety.

A third, significantly larger survey was sent organization-wide to gather additional insights regarding computer vision specifically (*n*=188). These results revealed a predominantly open-minded attitude across the organization. For example, 70% of employees "somewhat" or "strongly" agree that computer vision can improve workplace safety, while 79% agree it can help improve the quality of products. Most employees (77%) also indicated they support the use of computer vision in the workplace, with no significant difference observed between workers and managers.

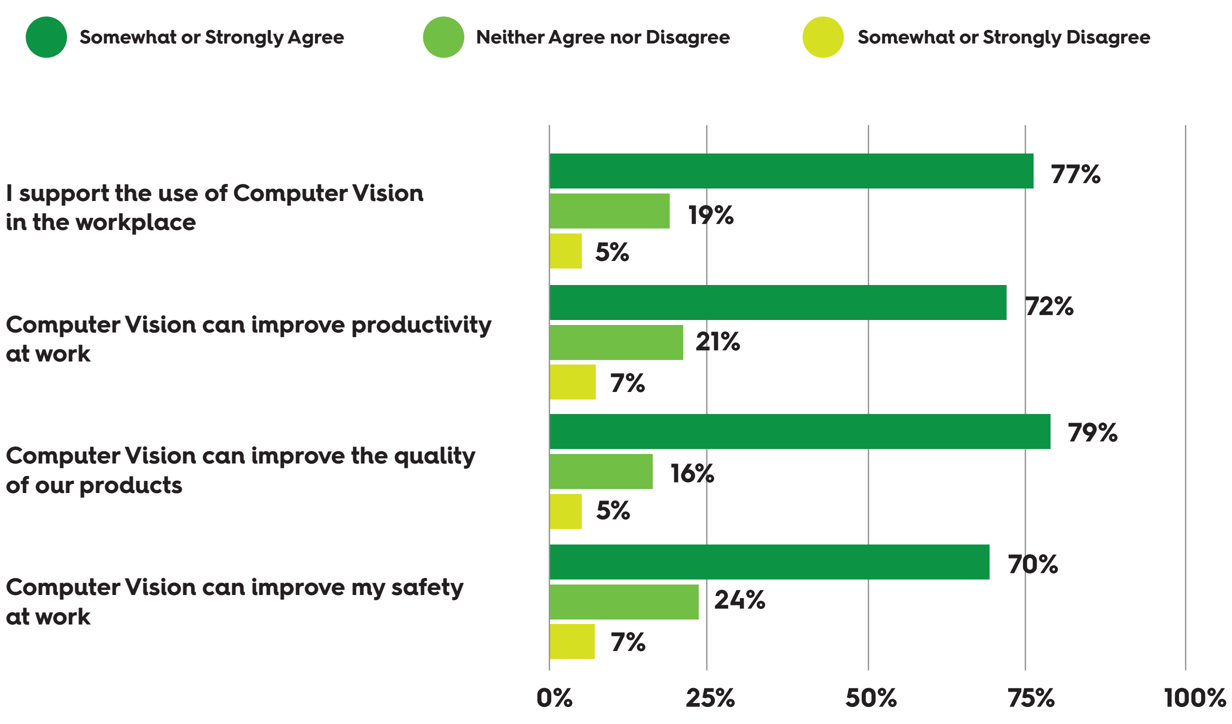


Figure 5. Perceptions of Computer Vision in the Workplace (*n*=188)

Respondents were also encouraged to share additional insights via an open-response option. Several respondents indicated a general willingness to trial computer vision in the workplace. Notable responses included:

- “I think it’s a great idea and can’t wait to see how it works.”
- “It would help a lot to be able to see certain things that are not visible to the eyes.”
- “The more technology can work alongside humans and assist in the tasks that the human struggles with, the more we will embrace changes.”
- “Any type of technology advancement that helps us get better is a good thing.”
- “If it would help [team members] stay safe I’m all for it. CAN DO.”
- "I feel that sometimes computer vision can help with things we don't detect."

Furthermore, several respondents not only expressed a willingness to trial new technologies but also critically considered how computer vision could be used in other areas of the workplace:

- “It would be very good to have sensors or product quality monitors."
- “… computer technology could also help with safety observations.”
- “It can help with the quality and safety as a casting operator by finding leaks and or cracks, so I think it’s a good thing.”
- “I think it would improve quality in production.”
- “Computer vision could outline the pinpoint of defects before and after…”

These comment boxes also provided an outlet for employees to share their questions or concerns. The responses highlighted the need to better educate workers on the use of computer vision, as many were unaware of the technology or how it could be used to enhance safety and quality. Several respondents also expressed a willingness to take additional training or courses to learn more about the technology. Finally, these results underscored some of the concerns held by employees regarding the use of computer vision in the workplace, most notably concerns that it would replace human workers in the facility or be used to monitor or track employees.

Pilot Barriers and Lessons Learned

SCM’s journey towards implementing computer vision technology was not without its share of challenges. This section is designed to highlight these barriers, with the goal of using these challenges as an opportunity to share valuable lessons learned. The objective is to streamline future pilot initiatives and provide guidance to employers considering the integration of computer vision into their own workplaces.

Barrier 1: Operational Challenges

A central challenge that emerged during the piloting process was the significant and unanticipated resource constraint within Service Center Metals. During the initial installation of Matroid’s system, SCM was undertaking the construction of two new plants. The establishment of these plants demanded a substantial time commitment from critical teams, most notably the EHS and IT departments. The complex logistics and resource allocation required for the new plants diverted attention and resources from the pilot project, delaying the pilot until December 2022.

In addition to the constraint on resources, communication barriers also existed which further slowed the process. For example, prior to the commencement of the project, the four-way agreement between Work to Zero, SafetyTech Accelerator, Service Center Metals and Matroid proved to be a greater undertaking than originally anticipated.

In particular, questions emerged regarding data privacy, storage and use which required additional time to address. According to the SCM Lead, the team often found themselves in a demanding learning curve while undertaking the highly technical task of building custom computer vision detectors. Communication often proved difficult, particularly while conveying complex technical information between Matroid’s engineers and SCM’s IT and EHS teams. Other logistical necessities for the project, such as gathering enough photos to train the model and installing additional cameras, further constrained company resources.

Another notable challenge contributing to resource constraints was managing the influx of alerts generated by the system. While training the models, early iterations of the computer vision software resulted in an overwhelming number of alerts, prompting a series of routine adjustments to fine-tune the frequency of alerts. To improve the quality of the detectors, SCM and Matroid held weekly calls, allowing both teams to proactively adjust the detectors for optimal performance. During times when new detectors were being rolled out, these calls were often increased to daily or as-needed check-ins to promptly make any adjustments needed.

Throughout the project's progression, a series of valuable lessons emerged, offering deeper insights into the intricacies of safety technology integration and its broader implications. To address the issues associated with resource constraints, the following insights were shared via interviews and check-ins.

Barrier 1: Lessons Learned

Piloting is an iterative process of continuous improvement

In his final exit interview, the SCM Lead acknowledged that Service Center Metals is undergoing an evolution away from the "let's do it and figure it out later" approach that was viable in the context of a smaller company. As the organization continues to expand, he reiterated the importance of early planning.

He noted the process of building two new plants significantly constrained SCM's resources and delayed the pilot process, where earlier and more extensive planning could have helped avoid these conflicts and streamline the process. He also emphasized the practical value of leveraging contractors where needed. For example, during installation, SCM hired contractors to install additional cameras within the facility, reducing the constraints on its internal teams.

Additionally, SCM recognizes the necessity of iteration and continuous improvement as it expands its use of computer vision. According to a key EHS leader: *"As we move forward, I anticipate the continued evolution of this detector. The progress witnessed so far, from overt errors to nuanced refinement, serves as an assurance that the algorithm is on an upward trajectory, one that will inevitably lead to improved performance."*

The SCM Lead also noted the responsiveness of the vendor is a critical aspect to consider when choosing a technology. Throughout the process, Matroid worked closely with the team to improve the models and deliver the data in their desired format, underscoring the necessity for both parties to remain agile. In summary, the pilot project exemplified the non-linear nature of technology adoption, emphasizing the significance of careful planning, adaptability and collaboration with technology partners to achieve a successful pilot and implementation.

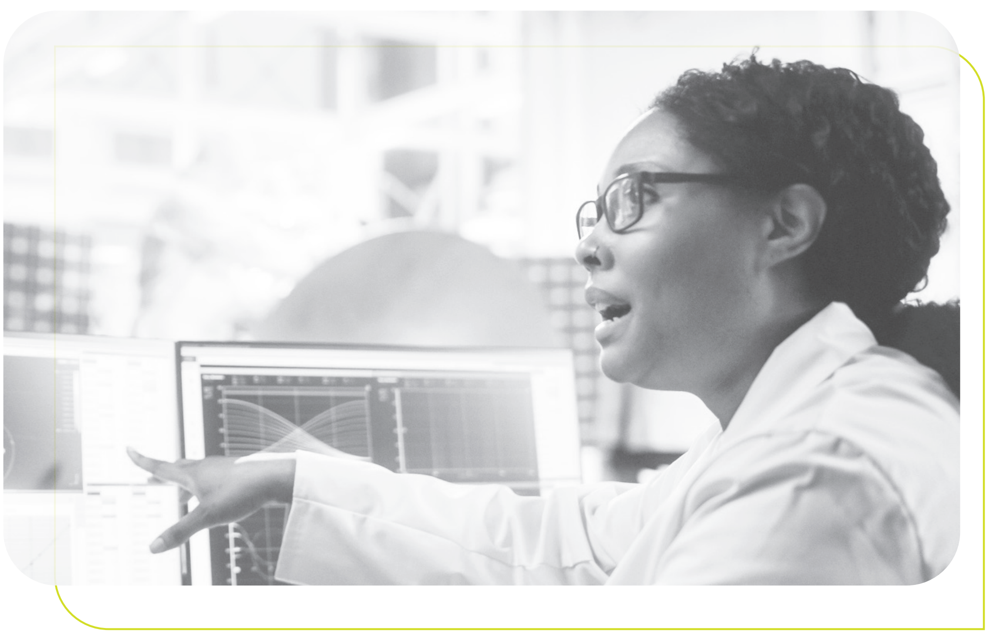
The value of clear communication

The value of clear and effective communication also emerged as a vital component of a technology pilot program. The SCM Lead expressed difficulties communicating between Matroid's Engineering Team and SCM's IT Teams, noting that many of the conversations were complex or highly technical.

Therefore, he emphasized the importance of having someone on the team who can act as a communication facilitator. This person would optimally possess a solid understanding of both the technical and non-technical aspects of the project, serving as a point of contact for Engineers, IT Teams and the EHS Team, ensuring that information flows smoothly and accurately across these groups. All pilot participants should also attend regular cross-functional team meetings, which should have a clear agenda and objectives, fostering communication between different groups.

Proactive planning can also help alleviate communication challenges. Both the participating employer and vendor should clearly define the roles and responsibilities of each team member involved in the project. This helps to eliminate confusion and potential overlaps in responsibilities, ensuring that each team knows what is expected of them by the next check-in. Participants should also take care to use plain, non-technical language in their communications, especially when conveying complex ideas.

Finally, it is recommended that careful documentation takes place during the pilot process, including written follow-ups, technical specifications and action plans. This allows all stakeholders to remain engaged in the pilot process, provide feedback and reflect on previous conversations.



Barrier 2: Employee Buy-In

Another challenge associated with piloting computer vision software was the complex dynamics of employee buy-in and the critical role of addressing concerns and fostering trust across the organization. According to the SCM Lead, the size of the company and open communication with employees helped earn employee buy-in during the pilot.

However, open-ended survey responses, while positive overall, did highlight concerns from employees. For example, common points revolved around the use of technology to monitor or track employees, privacy concerns and whether the system would replace human workers. One participant wrote: *"I feel as computer vision is just a way to track employees in a negative way."* Another participant wrote: *"If it fits in an area that's NEEDED [then] use it. As long as nobody's gonna lose their job [be]cause of this technology."*

According to the SCM Lead, the current size of the organization allows management to have personalized, one-on-one conversations with employees, allowing them to ask questions, provide feedback and share potential concerns. However, as the company continues to grow, these opportunities for one-on-one conversations will decrease, and he anticipates organizational trust will naturally erode over time.

Additionally, while the software is not used as a punitive safety measure, he anticipates the cameras might be perceived by employees as such. For example, if an employee is terminated, employees may falsely attribute it to the presence of the cameras. With these questions and concerns in mind, SCM employed several communication strategies (i.e., engaging often and being transparent) which aided in the process of earning employee buy-in.

Barrier 2: Lessons Learned

Engage with employees often

This project highlighted the importance of transparency and employee involvement as critical components for successful technology integration. At Service Center Metals, management relies on both formal and informal opportunities for worker engagement. Formal channels provide structured opportunities for updates and questions. This might include regular team meetings, training and one-on-one conversations. Informal channels, on the other hand, allow for more candid discussions, enabling workers to express concerns or ideas in a more relaxed environment.

For example, SCM managers often host “Lunch and Listen” events, where employees are welcome to talk about the current state of the organization and bring forth any questions or concerns about the workplace. These opportunities also allow workers to become more familiar with management in other departments, such as EHS, Human Resources or Operations.

An alternative channel leveraged by SCM is Beekeeper, a software that enables employees to send and receive important communications on one central platform. SCM used Beekeeper as an open forum during the pilot with Matroid, encouraging workers to post ideas about future initiatives they’d like to see from Matroid, share any potential concerns or issues with the software, and ask questions.

Some organizations might also find it useful to gather a group of independent, capable and flexible team members to aid in the trial and adoption process and troubleshoot issues regarding utility, integration and scalability. These individuals can be considered “digital champions” – individuals who are curious and enthusiastic to learn about the benefits technology can offer (Work to Zero, 2022). These individuals may be involved in trialing new technologies, assisting in training or facilitating conversations between workers and management.

Transparency is key to employee buy-in

Transparency also emerged as a vital component for earning employee buy-in. To alleviate concerns about being monitored, the SCM Lead took time to show employees the locations of the cameras, explain their purpose and provide a clear understanding of what data is being collected and why. Currently, SCM is also in the process of installing monitors throughout the facility, allowing workers to see the location of the cameras. This approach not only promotes a culture of openness but also enhances employee comfort and confidence, contributing to a more positive and collaborative work environment.

Along with physical visibility, SCM took steps to clearly communicate the pilot project's purpose, utilizing both informal and formal channels. To address employee concerns specifically related to being tracked or monitored, they took time to explain how the system works, how data is collected and where it is stored, informed in part by early conversations regarding data privacy and storage with Matroid. They also explained the system's utility as a proactive safety tool and engaged with employees to better understand how computer vision might be useful in their own roles. Finally, in these communications, SCM clarified that the footage will not be used as a punitive safety tool but to enhance safety within the shipping docks.

Barrier 3: Return on Investment

For new and emerging technologies, a lack of evidence for return on investment (ROI) and potential effectiveness are often barriers to adoption (Interdisciplinary Center for Healthy Workplaces, 2015). According to the SCM Lead, earning management buy-in proved challenging, as the technology would not garner a significant enough ROI solely in the shipping docks. Additionally, there is a need for further academic research and comprehensive case studies on the use of computer vision to supplement these conversations and provide evidence of its effectiveness. SCM also encountered unanticipated costs involved in installing the computer vision software. For example, the initial installation of additional cameras contributed to "sticker shock" as described by the SCM Lead.

Initial start-up costs and challenges communicating the "true" ROI therefore proved to be a barrier to its scalability. However, during and after the pilot of Matroid's system, SCM identified several safety and operational applications for the technology that could significantly improve the ROI. The SCM Lead also provided several lessons learned to help employers navigate the ROI of safety technology.

Barrier 3: Lessons Learned

Explore additional applications of technology

With over twenty cameras across the plant, Matroid's reach will be extended to other areas of the worksite, including additional safety and operational applications. According to the SCM Lead, these future use cases for the system would justify any initial implementation costs incurred. While brainstorming the diverse use of the technology to address safety concerns, he shared examples of "stretch goals" for SCM's application of Matroid's system.

First, he emphasized the versatility of computer vision on workplace safety, sharing examples of how the technology can be expanded at Service Center Metals beyond risks associated with working at height. For example, computer vision detectors can be built to correlate the number of packers per packer station with fatigue-related injuries to make more informed staffing decisions. To combat workplace violence, computer vision can also be used to detect the presence of weapons in the parking lot or buildings and alert supervisors to take proactive action. Another application would involve deploying detectors to recognize the presence of individuals or propane tanks when the furnace doors are open, mitigating potential risks associated with fires, explosions or burns.

He also shared other potential benefits of computer vision beyond workplace safety. Currently, SCM and Matroid are actively working on building detectors to identify potential quality issues in the metal. He noted the ability to identify and improve metal quality by just a marginal percentage could yield the company significant savings over time.

Additionally, the sensors can serve as a proactive control against injury, as quality issues such as contaminants, scratches or hot pockets may pose an additional hazard for workers handling or loading the metal. Use of the technology can also be used to streamline the inventory process, including piece counting of the metal. This exploration of the expanded use case of computer vision in the workplace highlights how the pilot fostered and improved innovation within Service Center Metals.

Do not undervalue workplace safety

The total cost of workplace injuries in the United States was $167 billion in 2021, or about $42,000 per medically consulted injury (NSC Injury Facts, 2023). This figure accounts for wage and productivity losses ($47.4 billion), medical expenses ($36.6 billion) and administrative expenses ($57.5 billion).

However, the SCM Lead argued these figures may not account for other “hidden” costs associated with safety. He suggested the idea of an "emotional ROI," which would convey the value of technology by capturing intangible benefits. This could include improved employee morale, enhanced workplace culture, reduced stress or increased job satisfaction, all of which contribute to a more positive and productive work environment. The notion of an "emotional ROI" encourages a broader perspective recognizing the holistic impact of technology adoption beyond just the financial benefits.

In 2023, the National Safety Council released a new whitepaper: *New Value of Safety: From ESG to the Whole Person* (NSC, 2023). This report highlights three organizational concepts that generate broad value and drive a holistic approach to safety management for highly embedded and emerging risks.

The SCM Lead also reiterated the importance of early planning and development. In terms of gathering ROI information, he recommends organizations refrain from beginning a project unless they have a plan to commit to paying for the technology for at least six months. This timeline helps both the organization and the vendor install the necessary hardware or software, garner employee support, and address any operational or logistical challenges before the commencement of the pilot.

Conclusions

In summary, the collaboration between Service Center Metals and Matroid indicates computer vision may be a viable tool for early detection of critical safety risks, including those associated with work at height. The significant increase in daily airbag compliance rates from 25% to over 90% showcases the tangible benefits of the technology. Additionally, with increases in unsafe observations increasing 400%, SCM can dedicate more attention to safety challenges since airbag compliance has been streamlined. The pilot also helped SCM improve its digital readiness from **Adopting** to **Integrating**, with additional qualitative evidence indicating overall improvements in safety compliance and workplace culture.

However, the journey also unveiled challenges such as resource constraints, communication hurdles, securing employee buy-in and assessing ROI. These hurdles serve as valuable lessons for future endeavors. Early planning and development emerged as pivotal success factors, underscoring the importance of careful preparation. Furthermore, effective communication strategies and transparency with employees were instrumental in collecting essential feedback and addressing concerns promptly.

In conclusion, the pilot provided valuable insights into the benefits and challenges associated with computer vision technology. While applications in this study were limited solely to risks associated with working at heights, Service Center Metals has extended its contract with Matroid intending to explore other future applications for the technology, including detecting fires or explosions and tracking PPE compliance. Moving forward, safety professionals must leverage these insights and lessons to pave the way for future safety initiatives. As the safety industry continues to progress, these findings should serve as a valuable reference point for future safety initiatives. This case study serves as a practical example, illustrating how technology, strategic planning and effective communication can collectively contribute to the creation of safer and more responsive workplaces.

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Participants

Service Center Metals is an aluminum extrusion manufacturing plant based in Prince George, Virginia. Specializing in aluminum rods, bars, shapes and tubing, the company supplies metal service centers across the United States. Service Center Metals employs approximately 400 employees.

Matroid, based in Palo Alto, California, is a computer vision company that offers a platform to build and deploy computer vision detectors. The company works across industries, helping companies maintain compliance, proactively identify hazards and monitor personal protective equipment (PPE) with real-time monitoring and alerts.

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