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Is Lean Safe or is Safe Lean? New Approach: Make Change Happen

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Abstract:- Based on my previous paper, "Is Lean Safe or Is Safe Lean? A Case Study on Lean vs. Safety Principles," there is a growing need for a new model to ensure safe outcomes while employing lean methodology. In this second paper, we introduce a new model called "Make Change Happen." This paper demonstrates how this model can help avoid high hazards by integrating safe behaviors and lean tools. The "Make Change Happen" model provides a framework that ensures safety is maintained without compromising the efficiency and effectiveness of lean practices. Through detailed analysis and practical examples, this paper showcases the successful application of this model in real-world scenarios, highlighting its potential to transform safety outcomes in lean environments.

Keywords*:* Hazards, Lean, Make change happen, Safety.

1. Introduction

What is a *make change happen approach (lean-OHS (occupational health and safety) proposed model)?* The Make Change Happen method is a new approach to creating a safe work culture by integrating lean manufacturing tools in a systematic way and focusing on the most critical activities. The method involves 5 steps, with employees being a central part of the solution and having the opportunity to use lean manufacturing tools in a systematic and efficient manner.

Step 1 involves selecting the critical task that needs to be changed using a method called the Darn good question, which asks a smart question to define the most critical activity. This can be based on different lean tools such as Gemba Walk, Pareto Chart...

Step 2 involves defining and analyzing behavior by observing people's actions and asking "why?" when they are not following the rules. This helps to examine the reasons for the behavior and is a key step in changing it. This can be based on different lean tools such as 5 Whys, Ishikawa...

Step 3 involves intervening and measuring the impact of the behavior. Behavior can be directly measured and influenced by managing the consequences. Understanding the processes within which people work and changing these systems to minimize the impact of human error is crucial. This can be based on different lean tools such as Root Cause Analysis, Plan-Do-Check-Act (PDCA)...

Step 4 involves scaling up the changes until the expected behaviors are consistent and the change happens. This can be based on different lean tools such as A3 Thinking, Hoshin Kanri…

Step 5 involves confirming, celebrating, and perpetuating the change by validating with hierarchy, approving the change, and making a final debriefing to confirm with the team and celebrate. This can be based on different lean tools such as Visual Management, Continuous Improvement Events…

To implement the *Make Change, Happen* method effectively, involve both management and non-management personnel and use a steering committee to guide the process. Hold regular meetings to review data and

communicate to all. Identify critical behaviors and their root causes. Correct unsafe behavior through positive feedback, motivation, and coaching, and hold employees accountable for serious offenses. Implement a tracking system to analyze observation trends and use leading indicators to drive continuous improvement. Continuously evaluate the observation process for effectiveness and focus on eliminating at-risk behaviors.

Fig. 1: Make Change Happen Process Diagram

2. An Application of Make Change Happen (Lean- OHS Model)

The finishing department, responsible for preparing the final product for shipment to customers, was chosen as the pilot area for implementing the new model. This department had a high occurrence of critical situations and hazardous behaviors, especially the lack of segregation between pedestrians and forklifts. Following this, high-priority tasks such as lubrication and working at height were selected for implementation of the new model.

3. Case Study: Make Change Happen Success Stories

A. First project: ensuring pedestrian safety in high-traffic areas with forklift and insufficient segregation measures

Pedestrian safety is an important concern in high-traffic areas, especially where forklifts are present and segregation measures are insufficient. Forklifts are heavy and powerful machines that can cause serious injuries or even fatalities if they collide with pedestrians. Therefore, it is crucial to take appropriate measures to ensure the safety of pedestrians in these areas.

- **Step 1: Select Task or Critical Area**

We implemented the MCH (make change happen) approach in high-traffic areas where insufficient segregation measures were present to improve safe behaviors and prevent accidents involving pedestrians and forklifts. The primary hazards that are encountered are as follows:

1. **Collision with forklifts:** Pedestrians are at risk of being struck by a forklift operating in the high-traffic area. Forklifts can move quickly and may have limited visibility, making it difficult for operators to see pedestrians in their path.

2. **Falling objects:** Forklifts may be transporting materials that could fall and injure pedestrians in the area. This risk is increased in areas with insufficient segregation measures to keep pedestrians and forklifts separated.
3. **Slip, trips, and falls:** Pedestrians may be at risk of slips, trips, and falls in areas with uneven surfaces, debris, or other hazards. Forklift traffic can also create congestion and make it difficult for pedestrians to navigate safely.
4. **Lack of training:** Both pedestrians and forklift operators may be at risk if they have not received sufficient training on safe work practices and critical behaviors. This can increase the risk of accidents and injuries in the high-traffic area.
5. **Inadequate signage:** Inadequate or unclear signage may make it difficult for pedestrians to understand the risks and take appropriate precautions. This can increase the risk of accidents and injuries in the high-traffic area.

- **Step 2: Define and Analyze Critical Behaviors**

1. **Identify critical behaviors:** Based on the results of the risk assessment, the critical behaviors identified are:

– Failing to follow designated pedestrian routes or ignoring signage indicating pedestrian areas.

– Not paying attention to forklift traffic or being unaware of a forklift's movements.

– Attempting to cross the path of a moving forklift without ensuring that it is safe to do so.

– Engaging in distracted walking, such as using a mobile device or listening to music, prevents the pedestrian from being aware of their surroundings.

– Not wearing appropriate PPE, such as high-visibility vests or hard hats, to increase visibility and protect against potential hazards.

– Walking or standing too close to forklift traffic or near loading and unloading areas without proper segregation measures in place

2. **Provide feedback:** We used video to demonstrate and give feedback to workers on their performance related to critical behaviors. This involved conducting regular performance evaluations, providing coaching, and implementing other feedback mechanisms to identify areas for improvement.
3. **Define the desired behaviors and Address barriers:** We identified and addressed the layers that may have prevented workers from performing the desired safe behaviors while performing the tasks. The critical behaviors that should be respected when performing the tasks are:

– Minimize reversing movements and prioritize forward movements of forklifts.

– Always follow designated pedestrian routes and obey signage indicating pedestrian areas.

– Stay alert and aware of your surroundings, particularly when near forklift traffic.

– Do not attempt to cross the path of a moving forklift without ensuring that it is safe to do so.

– Avoid distracted walking and refrain from using mobile devices or listening to music.

– Wear appropriate PPE, such as high-visibility vests and hard hats, to increase visibility and protect against potential hazards.

– Maintain a safe distance from forklift traffic and loading and unloading areas, and seek out alternative routes if necessary.

– Be mindful of blind spots and avoid standing or walking in areas where visibility is limited for forklift operators.

– Report any safety concerns or hazards to a supervisor or manager immediately.

– Participate in training sessions and safety drills to improve awareness and preparedness in case of an emergency.

- **Step 3: Observe and Measure Behaviors**

1. **Intervene to promote safe behaviors:** We have implemented several strategies to promote safe behaviors among pedestrians and forklift operators. This includes providing regular safety training to workers, reminding them of safe work practices, and fostering a safety culture that prioritizes pedestrian safety.
2. **Monitor and measure behavior:** We implemented various methods to monitor and measure behavior in the high-traffic area. This involved conducting observations or safety audits to assess whether workers are following safe practices and critical behaviors.
3. **Collect data on near-miss incidents:** We collected data on near-miss incidents and other safety-related events to better understand the impact of behavior on pedestrian safety in the area. This allowed us to identify areas for improvement and adjust our safety interventions as needed.
4. **Analyze data:** We have analyzed the data collected to identify trends, patterns, and areas for improvement. Through this analysis, we have identified critical behaviors that are most effective in promoting pedestrian safety in the high-traffic area.
5. **Continuously improve:** We utilized the data and analysis collected to continuously improve safety interventions and critical behaviors. We made adjustments to our training programs, implemented new safety measures, and modified work practices to promote safer behavior in the high-traffic area.

- **Step 4: Reinforce Safe Behaviors**

1. **Document successful interventions:** We have documented the successful interventions that we implemented and led to improved safety outcomes related to pedestrian safety in high-traffic area. Our documentation includes case studies, best practices, and lessons learned.
2. **Create a safety culture:** We have established a safety culture where all employees understand the importance of safety and feel empowered to take an active role in improving safety outcomes related to pedestrian safety in high-traffic areas. This involved providing regular safety training, ongoing communication about safety, and a commitment to continuous improvement.
3. **Share best practices:** We shared best practices with other departments or facilities within our organization and also with industry associations and other organizations in the community to promote a culture of safety beyond our immediate work environment. This helped to spread knowledge and create awareness about the importance of safety.
4. **Set targets and track progress:** We have set targets for improving safety outcomes in the high-traffic area related to pedestrian safety, and we are tracking our progress towards these targets. This approach can motivate employees and ensure that our organization is making continuous progress towards its safety goals.

- **Step 5: Sustain "Repeat, Validate, Celebrate"**

1. **Recognize and celebrate success:** As the organization, we have implemented a program to recognize and celebrate successful pedestrian safety in high-traffic areas. We provide positive feedback and acknowledge individuals or teams who consistently perform well. In addition, we publicly recognize success to motivate employees and promote a culture of safety.
2. **Establish a feedback mechanism:** We have established a mechanism to provide feedback to workers on their performance related to pedestrian safety in high-traffic areas. This includes conducting regular performance evaluations, gathering feedback through surveys, and utilizing other feedback mechanisms to identify areas for improvement.

3. **Provide ongoing training:** We provided regular training to workers on pedestrian safety in high-traffic areas, including best practices. This helped to ensure that workers were knowledgeable about the latest advancements in safety and could continue to implement safe practices.
4. **Share success stories:** As an organization, we shared success stories and best practices related to pedestrian safety in high-traffic areas. By doing so, we aimed to promote a culture of continuous improvement and encourage workers to adopt good practices that have worked well in other areas of our organization.
5. **Establish a reward system:** We have established a reward system to incentivize workers to consistently perform well in pedestrian safety in high-traffic areas. This includes bonuses, promotions, or other rewards to encourage and perpetuate good practices.
6. **Evaluate and adjust:** We continuously evaluate the impact of our efforts to improve pedestrian safety in high-traffic areas and adjust the plan as needed. We regularly identify areas for improvement and make adjustments to the training or reward system to ensure that our safety interventions remain effective.

B. Second project: ensuring work at height intervention involving overhead cranes

- **Step 1: Select Task or Critical Area**

One of the leading causes of work accidents is working at height, and when combined with interventions into overhead cranes, the potential hazards and complexity of the task increases. This is why we have identified this particular case as a critical task that requires significant improvements in safety measures. The main potential hazards that have been identified include:

1. **Falling from heights:** Workers can fall from heights if they are not properly secured while working at height on an overhead crane. This can result in serious injury or even death.
2. **Electrocution:** Overhead cranes are powered by electricity and workers can be electrocuted if they come into contact with electrical equipment while working at height.
3. **Structural collapse:** Overhead cranes are heavy pieces of equipment that can cause structural collapse if they are not properly supported or maintained. This can result in serious injury or death for workers on or around the crane.
4. **Struck by falling objects:** Workers can be struck by falling objects if they are not properly secured or if objects are dropped from the overhead crane while work is being performed at height.
5. **Equipment failure:** Overhead cranes can malfunction or fail if they are not properly maintained, which can result in serious injury or death for workers.

- **Step 2: Define and Analyze Critical Behaviors**

1. **Identify the critical behaviors:** As part of our safety program for working at height on an overhead crane, we first identified the specific critical behaviors that are essential for ensuring worker safety. These behaviors include properly securing safety equipment, following safety protocols such as using fall protection systems and ensuring that the crane is properly inspected before use, and maintaining situational awareness while working at height. By prioritizing these critical behaviors, we have created a safer working environment for our workers and reduced the risk of accidents and injuries while working on an overhead crane.
2. **Define the desired behaviors:** We conducted a risk assessment during the replacement of overhead crane lifting cables and identified various hazards that could potentially harm workers. One of the significant risks identified was falling due to unsafe behavior. Specifically, we found that the majority of workers forget to keep their harness hooks attached to a secure location, which increases the risk of accidents. To address this issue, we implemented targeted training programs and reminders to ensure that workers always secure their harness hooks when working at height. By emphasizing the importance of safe behaviors, we were able to reduce the risk of accidents and improve the safety of our workers during overhead crane cable replacement tasks.

3. **Provide feedback:** As part of our efforts to improve safety in the workplace, we implemented a video-based feedback system to monitor workers' performance related to critical behaviors. This involved regular performance evaluations and coaching sessions, where workers were given feedback on their performance and provided with suggestions for improvement. By using video to capture workers' actions and behaviors, we were able to identify areas where critical behaviors were not being followed, and provide targeted training to address these issues. This feedback mechanism has been effective in improving workers' adherence to critical behaviors and enhancing safety in the workplace.
4. **Address barriers:** As part of our safety program, we identified potential layers that may prevent workers from performing critical behaviors as desired. These layers included issues such as inadequate training, heat stress, and insufficient safety equipment. To address these issues, we implemented targeted solutions such as providing comprehensive training programs for workers, installing cooling measures to mitigate heat stress, and ensuring that all workers have access to proper safety equipment. By addressing these layers and removing barriers to critical behavior performance, we were able to create a safer working environment for our workers and reduce the risk of accidents and injuries.
5. **Monitor and evaluate:** As part of our safety program, we implemented a continuous monitoring and evaluation system to ensure that critical behaviors are being maintained over time. This involved conducting regular safety audits and inspections to identify any areas for improvement. By monitoring the impact of our efforts, we were able to identify potential issues and take corrective action promptly. This allowed us to maintain a high level of safety in the workplace and ensure that workers are adhering to critical behaviors. Our continuous monitoring and evaluation system have been effective in reducing the risk of accidents and injuries and improving overall safety in the workplace.

- **Step 3: Observe and Measure Behaviors**

1. **Intervene to reinforce desired behaviors and to make change happen:** As part of our safety program related to working at height on overhead cranes, we implemented a variety of interventions to reinforce desired behaviors. These interventions included providing harnesses with a double hook to ensure that workers are always attached, offering regular training and coaching to promote safe behaviors, installing visual reminders and safety equipment, and providing incentives for adherence to critical behaviors. By reinforcing desired behaviors, we were able to create a culture of safety in the workplace and reduce the risk of accidents and injuries. These interventions have been successful in promoting safe behaviors among workers and improving overall safety in the workplace.
2. **Collect data on behavior and safety outcomes: As part of our safety program related to** working at height on overhead cranes, we collected data on worker behavior and safety outcomes. This involved using video to assess the frequency of interventions and the level of adherence to critical behaviors and safety protocols. By collecting this data, we were able to identify areas for improvement and take corrective action where necessary. This allowed us to improve overall safety in the workplace and reduce the risk of accidents and injuries related to working at height on overhead cranes. Our data collection methods have been effective in promoting safe behaviors among workers and ensuring that critical behaviors are being maintained over time.
3. **Analyze data:** As part of our safety program, we analyzed the data we collected to identify patterns and trends related to worker behavior and safety outcomes. By doing so, we were able to identify areas where interventions may be needed and gain insights into the effectiveness of our current interventions. This allowed us to take proactive steps to address potential issues and further improve our safety program. Our data analysis methods have been effective in helping us make data-driven decisions and continuously improve the safety of our workplace.
4. **Adjust interventions as needed and create new Standard Operating Procedure:** As a result of our data analysis, we identified areas where adjustments to our interventions were necessary to further improve behavior and safety outcomes. These adjustments included changing training methods, modifying safety equipment, and providing additional incentives for safe behaviors. By making these changes, we were able to

reinforce desired behaviors and enhance the overall safety of our workplace. Our intervention adjustments have been effective in promoting safe behaviors and reducing the risk of accidents and injuries related to working at height on overhead cranes.

- **Step 4: Reinforce Safe Behaviors**

1. **Document successful interventions:** As part of our ongoing efforts to improve safety outcomes related to work at height on overhead cranes, we documented the successful interventions that we implemented. This documentation included case studies, best practices, and lessons learned, which were used to share our experiences with others and to promote the adoption of similar interventions in other workplaces. By sharing our successes and lessons learned, we aim to contribute to a safer and healthier workplace culture for all. Our documentation efforts have been instrumental in promoting knowledge sharing and continuous improvement in workplace safety.
2. **Create a safety culture:** We made it a priority to establish a safety culture in which all employees understand the importance of safety and feel empowered to take an active role in improving safety outcomes related to work at height on overhead cranes. To achieve this, we implemented regular safety training sessions, ongoing communication about safety, and a commitment to continuous improvement. By promoting a safety culture, we aim to ensure that safety is always a top priority and that all employees feel confident and equipped to perform their duties in a safe and secure manner. Our efforts to establish a safety culture have led to a more engaged and motivated workforce, and have helped to create a safer and healthier workplace for all.
3. **Share best practices:** As part of our efforts to promote safety, we have shared our successful practices with other departments and facilities within our organization, as well as with industry associations and other organizations in the community. By doing so, we hope to spread knowledge and promote a culture of safety beyond our immediate work environment.
4. **Set targets and track progress:** As part of our safety program, we set specific targets for improving safety outcomes related to work at height on overhead cranes. We regularly track progress towards these targets and use the data to motivate employees and ensure that we are making meaningful progress towards our safety goals.

- **Step 5: Sustain "Repeat, Validate, Celebrate"**

1. **Recognize and celebrate success:** As an organization, we have established a program to recognize and celebrate successful working at height on an overhead crane. We acknowledge individuals or teams who consistently perform well and provide positive feedback to encourage them to continue their excellent work. We also make it a point to publicly recognize success, whether through announcements, certificates of achievement, or other forms of recognition.
2. **Establish a feedback mechanism:** We have established a mechanism for providing feedback to workers on their performance related to working at height on an overhead crane. This may involve conducting regular performance evaluations, surveys, or other feedback mechanisms to identify areas where workers can improve their critical behaviors for safety.
3. **Provide ongoing training:** We have been providing ongoing training to workers on new practices and best practices related to working at height on an overhead crane. This has helped to ensure that workers are up-to-date on the latest advancements in the field and can continue to implement safe practices.
4. **Share success stories:** We have shared success stories and best practices related to working at height on an overhead crane across the organization. By doing so, we hope to promote a culture of continuous improvement and encourage workers to adopt good practices.
5. **Establish a reward system:** We have established a reward system to motivate workers to consistently perform well in working at height on an overhead crane. The system includes bonuses, promotions, and other incentives

that encourage and reinforce good practices. This helps to create a culture of excellence and continuous improvement in our organization.

6. **Evaluate and adjust:** We continuously evaluate the impact of our efforts to improve working at height on an overhead crane and make adjustments to the plan as needed. This includes identifying areas for improvement and making necessary adjustments to the training or reward system to ensure continuous improvement.

C. Third project: ensuring safe lubrication practices near running machine

- **Step 1: Select Task or Critical Area**

We have identified lubrication routines near operating machinery as a high-risk activity and a priority area for safe critical behaviors and safety measures. Some potential hazards include contact with hot surfaces, exposure to chemicals, slip and fall accidents, equipment failure, and fire or explosion risks. It's important to implement safety measures and follow critical behaviors to reduce the risk of injury or harm.

- **Step 2: Define and Analyze Critical Behaviors**

1. **Identify critical behaviors:** We have identified potential critical behaviors that could cause injury during lubrication tasks, such as failing to wear appropriate PPE, overfilling or underfilling bearings with oil, using tools improperly, failing to secure machinery properly, and neglecting proper lockout/tagout procedures.
2. **Provide feedback:** We use video feedback and other mechanisms to provide regular evaluations, coaching, and feedback to workers on critical behaviors. We have defined safe behaviors and provided training, while addressing any barriers that could prevent workers from following them.
3. **Monitor and evaluate:** We will continuously monitor and evaluate the impact of our efforts to enhance safety during lubrication routines, conducting safety audits or inspections to identify areas that need improvement and ensure critical behaviors are maintained over time.

- **Step 3: Observe and Measure Behaviors**

1. **Communicate results and progress:** We have communicated the results of our data analysis and progress towards safety goals to all employees. This has helped to keep everyone informed and engaged in the process of improving safety outcomes related to lubrication tasks.
2. **Continuously improve:** We have made a commitment to continuously improve our safety efforts related to lubrication tasks. This means that we regularly evaluate the effectiveness of our interventions, adjust as needed, and seek out new ideas and best practices to incorporate into our safety program. By continuously improving, we can ensure that we are always working towards the goal of achieving zero injuries and incidents in the workplace.

- **Step 4: Reinforce Safe Behaviors**

We document successful interventions and share best practices to improve safety outcomes related to lubrication tasks. We have established a safety culture and regularly provide safety training and communication. We share our best practices with other departments, facilities, and industry associations and we have set targets and track progress towards our safety goals.

- **Step 5: Sustain "Repeat, Validate, Celebrate"**

Actions to promote good lubrication practices include recognizing success, establishing a feedback mechanism, providing ongoing training, sharing success stories, establishing a reward system, and continuously evaluating and adjusting the plan.

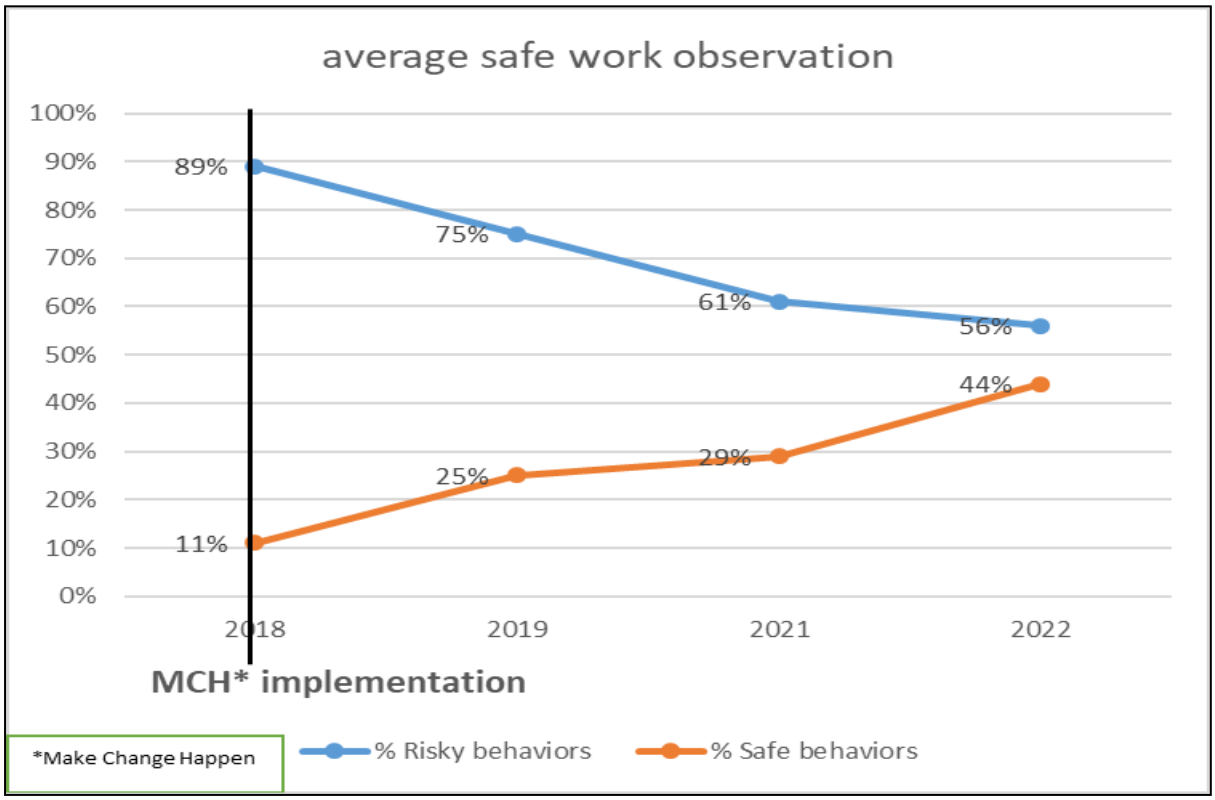

Fig.2: Average safe work observation trend

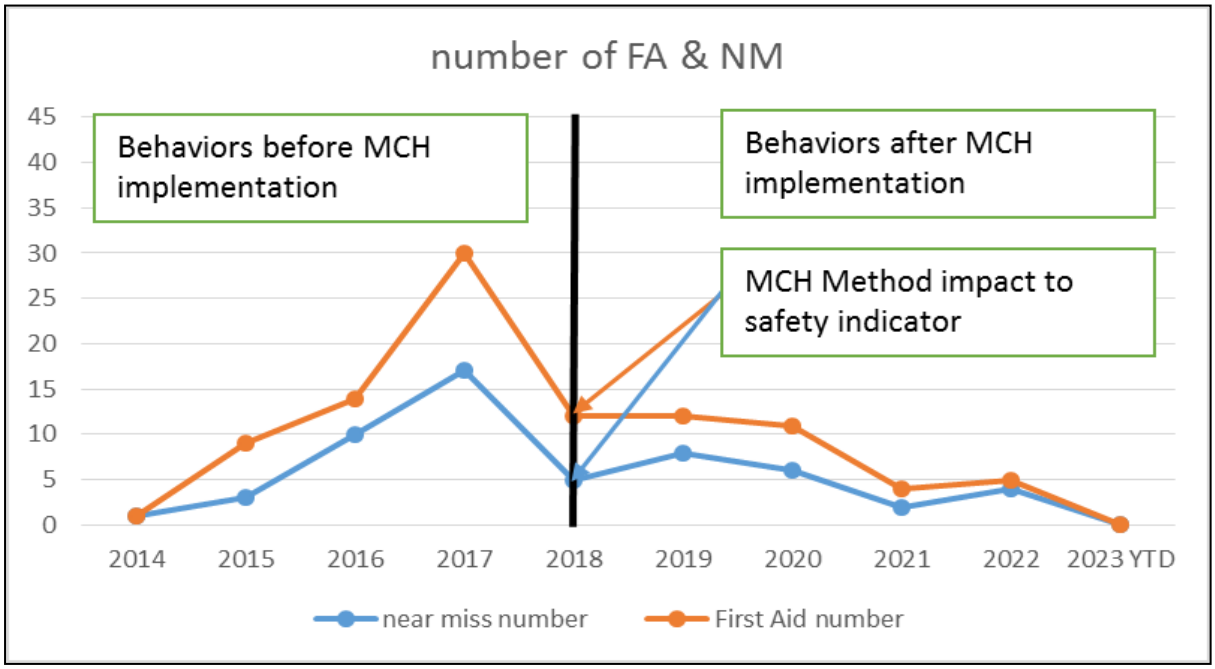

Fig.3: Tracking Lagging Safety Indicators

4. Conclusion

In conclusion, integrating Lean Manufacturing with safety requires careful attention and consideration. It is crucial to maintain safety as an absolute priority while pursuing the goals of efficiency and continuous improvement through Lean practices. However, there are limitations and important factors to consider ensuring successful integration:

1. Balancing priorities: Striking an appropriate balance between the productivity and efficiency goals of Lean Manufacturing and safety objectives is crucial. Safety should never be compromised in favor of productivity gains.
2. Adequate training: Providing comprehensive understanding of Lean Manufacturing principles and their impact on safety is essential. Proper training of employees is necessary to avoid potential errors and ensure a safe integration of Lean tools.
3. Managing resistance to change: Introducing new processes and methods may face resistance from employees, particularly if they perceive that safety is being compromised. It is important to involve employees in the change process, address their concerns about safety, and provide clear communication.
4. Adapting to complex operations: Some complex operations may require specific safety measures that may not fully align with Lean Manufacturing principles. It is crucial to carefully evaluate compatibility and find appropriate solutions to ensure safety in such situations.

To summarize, successfully integrating Lean Manufacturing and safety demands a thoughtful approach and proactive management. By prioritizing safety and taking into account the mentioned limitations, it is possible to reap the benefits of Lean while maintaining a safe and secure work environment

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