

# SAFETY AND HEALTH INVESTMENT PROJECTS FINAL REPORT

Striking Down Workplace Injuries – Struck (By and Against): Proactive and Dedicated  
Safety Awareness & Mitigation Solutions

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Timber Products Manufacturers Association (TPM)  
Project Contact Person: Latitia Estrada  
lestrada@tpmrs.com

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Author of Report: Latitia Estrada



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## PART I

### *Narrative Report*

#### **Abstract:**

The focus of this project was to bring struck-by and against hazard awareness to the forefront of safety programs by making the issue of strike hazards a standalone and essential safety topic for both management and workers. TPM worked to take struck-by risks from being a secondary training topic, to helping workers recognize these hazards as one of the leading causes of fatalities and injuries in the industry.

Incidents involving struck-by and against objects are a leading cause of injury throughout the wood products manufacturing process, from logging all the way through milling. TPM sees multiple fatalities and hundreds of injuries, ranging from bruises to amputations, every year throughout the industry that are a direct result of struck-by and against situations.

TPM safety staff worked to develop advanced tools and on-site training in order to educate businesses and lead to proactive safety decisions, competent struck-by and against programs and stronger safety cultures.

During the life of the grant TPM:

- Developed five high quality dynamic training tools:
  1. Struck-By/Against (JHA Tool) Smart Phone Application (App) for both iOS and Android,
  2. Striking Down Injuries – Struck-by and Against Safety Awareness Training – PPT Presentation with Quiz and Employee Worksheet
  3. Sample Policy and Program for Reporting Near Misses
  4. Near Miss Incident Investigation Guide
  5. Struck-by and Against Safety Committee Meeting Informational Sheet
- Provided outreach to 62 unique businesses.
- Trained 562 supervisors, business owners and workers.
- Provided 33 facility hazard assessments.

Major findings:

- TPM found positive changes towards enhanced safety cultures that were beginning to recognize struck-by and against hazards as a standalone safety issue. Both staff and management were showing evidence of placing a priority on making the topic an essential element of the company's safety program, instead of a small piece of other safety topics that are misperceived as "more important."
- While still early in the grand scheme of "change influence", trainers received reports of reduction in injuries resulting from struck-by and against safety awareness. This was particularly evident among companies that implemented the near miss programs. As employees learn how to manage their behaviors in the workplace (e.g., being aware of internal traffic patterns), account for the identified risks around them and identify near misses, injuries are beginning to decline.
- TPM witnessed a few long-term solutions implemented – investing in facility design factors including new and modern machine guarding being put into place, metal mesh

net installation, roadway/pathway markings and the beginning of designs for internal traffic control programs.

- The majority of companies that engaged in impact assessment conversations noted that they were beginning to build an active partnership between workers and management to create a stronger safety program, safety culture and safety responsibility mindset.

### **Purpose of Project:**

In an effort to properly address the hazards of struck-by and against dangers in the wood products industry and increase company focus on the topic, TPM worked to develop a comprehensive struck-by and against safety program with a focus on hazard prevention, mitigation training and management of potential and existing struck-by risks.

TPM produced materials and provided training and education outreach to small businesses on methods to eliminate struck-by risks and provide awareness to workers. This guidance includes struck-by and against job hazards found in individual worker positions, struck-by mitigation techniques (both engineering and administrative) and behavioral safety processes for actively avoiding struck-by accidents by recognizing and eliminating struck-by risk factors. TPM also engaged company leadership in order to instill a sense of accountability regarding struck-by hazard prevention.

The program was designed to lead to the increased safety of manufacturing companies and their employees throughout the state.

Through this project, TPM's vision had four main elements:

1. Bring struck-by and against hazards to the forefront of safety programs within small businesses in the wood products industry – making the topic a dedicated, standalone safety program that workers and management adhere to and advocate for. Instead of being a peripheral safety concern, TPM worked to make struck-by hazards a top safety priority.
2. Use modern training and education to ultimately reduce the number of injuries and fatalities occurring due to struck-by and against safety accidents. With struck-by and against incidents accounting for 25% of all workplace injuries, TPM's goal is to lower this number by providing workers and management with the tools and education to proactively address struck-by risks in their daily work environments.
3. Ingrain struck-by and against awareness into company safety culture by engaging both management and workers in an all-encompassing effort for full company buy-in/investment that includes teamwork and accountability from all personnel. This was done using a top-down approach that begins with management and flows to employees in a total company educational process. This process is essential to program success, because once a company is dedicated to, and takes ownership of, struck-by safety, they will truly be able to begin reducing injuries.
4. Educate small businesses on how to connect near miss reports to a successful safety program. TPM wants to link the proactive behaviors of near miss investigation and JHAs to successful safety cultures, the only way to provide safety awareness is to look at our environments, from every perspective and use our existing safety issues as platforms to initiate change. Near misses often go ignored and can be valuable opportunities/tools for good.

## **Statement and Evidence of the Results:**

### **General Overview**

Over the life of the project, the SHIP Grant has enabled TPM to successfully put forth a strategic effort to decrease struck-by and against workplace injuries through training and awareness. Through the design and development of a Struck-by and Against Awareness and Prevention Training Program, TPM has worked to educate workers about strike hazards and provide the industry with the tools to stop being reactive or ambivalent towards struck-by risks and injuries, and start providing workers with the safety knowledge necessary to prevent these potentially traumatic events from occurring in the first place.

Over the life of the grant, TPM's goals have consisted of two essential elements: 1) Development of a training program and modern technical resources designed to educate workers about the realities of struck-by incidents. Providing training for mitigating the various types of strike risks (i.e., falling objects, shifting materials, equipment tip overs, unexpected flying objects, vehicle strikes, etc.) and educating about engineering and administrative controls that can be used to prevent workplace injuries, and; 2) Training and outreach for at-risk workers both within the grant timeline and after the grant timeline is complete.

Each of these goals were met and exceeded over the life of the grant. Practical and beneficial training resources have been developed and TPM is now able to provide modernized training that makes Struck-By/Against Awareness an essential element of safety culture in manufacturing. Over the life of the grant, TPM worked hard to establish educational opportunities and is proud to have exceeded training goals by more than double. TPM trainers were able to provide direct outreach and training to 562 at-risk workers in manufacturing industries throughout Washington State.

TPM is proud to have developed a beneficial safety program for manufacturers and honored to work directly with industry workers to share safety knowledge. The timber industry has been in great need of affordable safety resources for decades and TPM can see the positive changes in safety behaviors in many workers due to the education and tools provided over the past year.

TPM has worked diligently to impact the industry and serve as a source of support, learning and aid to timber and manufacturing businesses and employees that would otherwise have no industry specific sources of safety education. TPM can see that training is impacting the industry by leading to safer working environments and knowledgeable businesses and employees.

Over the past year, TPM has witnessed tangible positive changes in the timber industry with regards to safety programs and worker attitudes towards struck-by hazards. TPM's trainers have worked to build up the industry's small business safety awareness with the goal and mindset of reducing strike-related incidents and injuries among manufacturers.

### **No-Cost Time Extension:**

Part of the enhanced success of this project, and our ability to surpass training projections and goals, was the approval of a no-cost time extension. TPM was able to complete grant goals from the original grant timeframe on-time and under budget. Once goals were completed, the struck-

by/against training program continued to receive requests and interest for outreach from companies.

TPM requested a no-cost time extension, using the funding remaining from the original grant budget, to enable trainers to provide increased outreach and training using the materials developed over the life of the grant. TPM also used the extension to enable trainers to provide outreach of the phone-based application that launched later than planned due to platform issues and development process taking longer than anticipated. TPM was excited for the opportunity to share the app with the industry and use the materials for increased outreach.

#### **Project Tasks Accomplished:**

<b>Project Deliverables</b>	<b>Estimated/Planned Results</b>	<b>Actual Results</b>	<b>Percent Accomplished</b>
<i>Design Safety Tools/Materials</i>	5	5	100%
<i>Individual Company Training/Outreach Events</i>	25	62	248%
<i>JHA Completions with Companies by TPM Safety Personnel</i>	20	33	165%
<i>Workers and Managers Trained</i>	250	562	224%
<i>Struck-By/Against App Users</i>	N/A	133 downloads	N/A

#### **Safety Items Designed and Developed**

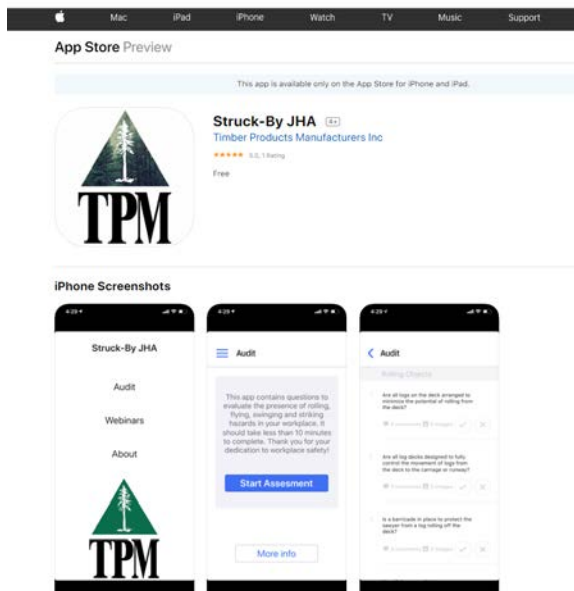
The materials produced and the training conducted was designed to lead to a top-down safety approach that provides an all-encompassing safety strategy for building a safe work environment. By ensuring management's understanding of the topic, a company is better able to implement new safety policies and awareness regarding dust hazards.

TPM designed target audience specific training and services using adult-based educational techniques that are proven to have high knowledge retention rates. The safety educational tools were developed to directly aid in the prevention of illness and injury inherent in all dust producing operations by directly addressing each hazard identified as a key topic of concern regarding combustible dust. The training program was designed to decrease occupational injuries while increasing worker involvement and use of safety knowledge.

#### **Tools and Training Developed:**

1. Mobile App – Job Hazard Analysis (JHA) Tool and Safety Guide for Struck-by Hazards  
This mobile app provides at-risk workers with a user-friendly, simplified and concise tool from which to learn about struck-by and against hazards and solutions. The app will also enable workers to complete an individual JHA that focuses on struck-by risks. There is a camera function that enables the option of inserting photos of key trouble areas and, upon completion of the audit, the app provides users with a full hazard assessment report including solutions to problem areas identified.

App in-store page:



## 2. Striking Down Injuries – Struck-by and Against Safety Awareness Training – Presentation with Quiz and Employee Worksheet

The presentation is an in-depth look into struck-by/against hazards. This item discusses: 1) struck-by and against hazards in the work environment; 2) best practices and varying techniques for struck-by solutions, avoidance and mitigations; 3) the importance of taking ownership of safety; 3) the critical link between near misses and a stronger safety program through investigation. Through this training, workers are educated on: a) how to assess risks in their own work spaces through JHAs; b) how to determine where a risk may arise; and c) behavioral safety processes such as constant observation of work area, awareness of sound from forklifts and machinery, being aware of product motion, eye contact with equipment operators, awareness of blind spots, etc.

The presentation is 54 slides long and is an all-encompassing educational tool in regard to struck-by and against hazards.

## 3. Sample Policy and Program for Reporting Near Misses

In an effort to educate small businesses on how to connect near miss reports to a successful safety program, a Near Miss Program was developed. TPM wants to link the proactive behaviors of near miss investigation and JHAs to successful safety cultures, the only way to provide safety awareness is to look at our environments, from every perspective and use our existing safety issues as platforms to initiate change. Near misses often go ignored and can be valuable opportunities/tools for good.

## 4. Near Miss Incident Investigation Guide

A basic layout of how to properly and effectively analyze a near miss to find the best mitigation solutions.

## 5. Struck-by and Against Safety Committee Meeting Informational Sheet

One of the most effective ways to instill safety topics into the minds of workers is small-group safety committee meetings with managers and peers. These meetings produce interactive and heartfelt discussions about personal experiences with near misses and hazards that workers have come across in their facilities. This resource helps to provide

a struck-by overview (and conversation starter) to initiate positive change as workers get a sense of teamwork and buy-in for safety and safe work practices.

### **Trainings**

A total of 562 workers and managers were trained. Trainers strove to make training interactive by engaging employees in discussion regarding their experiences with struck-by incidents (and near misses) and challenging them to identify areas within their work environments that pose strike risks.

A variety of training methods were developed in order to serve and accommodate the unique needs of the industry and various types of operations. These included the following delivery formats:

1. Face-to-Face Training
2. Centralized Multiple-Company Training
3. Webinars
4. Teleconferencing

### **Job Hazard Assessments (Using the Mobile App and/or Written Assessment)**

The job hazard assessments were one of the most essential accident prevention tools provided by the grant. The JHAs (both app-based and filled out on paper) work by finding hazards and eliminating or minimizing them before an employee performs their job.

The process is a sequence of basic job steps, potential hazards, and recommended actions. Requiring employees and management to put time and energy into identifying potential risks in daily tasks. This dedication to safety tends to aid in personal accountability and safer work practices.

TPM adopted a top-down approach to bring JHAs and the mobile app to the forefront of safety within the industry. We have found that by encouraging managers and company owners to use the app and see its benefits, those leaders then pass the app onward to their staff to complete individual job hazard assessments. This has led to some exciting changes because it has provided companies with multiple points of view on areas of risk. Often times, a manager will analyze an area and see no risk, but because they are not the one performing daily tasks right there, they are unaware of the constant struck-by near misses or hazards. The top-down approach eventually leads to open communication among staff about safety ideas and areas where we can decrease risk.

TPM staff worked daily to bring grant resources and materials to the companies that we visited. We encouraged app downloads and provided hands-on guidance for the first use to demonstrate how beneficial the tool can be for making positive safety changes and identifying problem areas.

App usage increased by about 30% in September – October of 2019, as more and more workers were introduced to the mobile tool. We could see that workers were beginning to use the hazard assessments in their various work environments and company safety officers were retaining the documentation and working to make safety changes to mitigate struck-by risks. The app has tied in nicely with TPM's effort to implement near miss programs as workers are able to identify what exactly entails a near miss as they analyze their work zones. Hazards

(such as flying debris) were just seen as part of the daily risk – now they are being identified as near misses and the app is providing safety solutions/ideas for reducing those risks.

For example, in one sawmill, the log debarker would sometimes shoot large chunks of debris out of the equipment (despite having proper guarding). In having this be identified as a near miss hazard, the safety manager worked to find a solution to stop the flying debris. An additional guard was fabricated to safely attach to the machinery in order to provide additional height to the guard to prevent wood chips/debris from flying out of the debarking area.

Dedicated time to advocating for the use of the Struck-By JHA mobile app was essential to outreach goals. Trainers aided workers in downloading the app and using the safety audits in their individual work stations. For facilities that prohibit handheld devices such as phones in the work area, trainers provided iPads to guide users through the process and aid in finding areas of risk. Managers and employees were all receptive to the use of the JHA app and were eager to analyze the facility for areas of safety improvement. Feedback has been consistently positive and workers have been particularly appreciative of the ease of use of the app. Multiple hazards were identified during each of these processes and plans for positive safety changes were implemented. Some of these changes included:

- enhanced/fixed machine guarding;
- enhanced effective (and required) PPE (i.e., hard hats in areas identified as dangerous, safety glasses, etc.);
- training on proper stacking and storing techniques;
- training on behavior and facility awareness;
- designated traffic control systems for forklifts, other PITs and machinery; and
- facility analysis for engineering controls that are cost effective and safety effective – particularly mesh nets and updated machine guards.

### **General Safety Guidance Resource**

TPM was able to answer a number of questions from companies regarding struck-by prevention – particularly in regard to flying object hazards from lumber and log cutting. The timber businesses that TPM serves were continually kept up to date on the training material progress, and all basic questions regarding struck-by/against hazards were always addressed immediately.

TPM was able to respond to a large number of questions and injury investigation assistance requests from companies regarding injuries.

Sample of injuries TPM handled over the life of the grant:

*Each of the below incidents was provided with an in-depth safety investigation, worker notification of rights and medical care, safety solutions to prevent further injuries and plant-wide struck-by prevention training.*

- Incident #1: An employee was struck-by a log kicked out by a metal check detection system. The employee was standing in a danger zone that they should not have been stopped in with the machinery in motion. The employee suffered a broken arm and collar bone.
- Incident #2: An employee suffered a crush amputation of all four fingers on his right hand (at or below the knuckle), when his hand was caught in between the bucket of a Bobcat, and the metal support beam conveyor.



- Incident #3: An employee lost all four fingers of his right hand while cleaning up ice and debris. As he loaded the debris by hand into the skid steer, the operator tilted back the bucket and caught the employee's hand between the bucket and the frame of the conveyor.
- Incident #4: An employee lost all four fingers of his right hand in a Dust Collector when the gate struck his hand. The Dust Collector was not shut down and when the gate struck his fingers they were immediately severed.
- Incident #5: Employee's hand and arm were pulled into planer while clearing out a jam-up. The employee received multiple lacerations to multiple fingers and the top of his hand.
- Incident #6: A contractor was struck-by a company work truck as he was tarping his load, which resulted in a fatality.

Three of these injuries occurred to employees with 10+ years of experience. This demonstrates the danger of complacency regarding struck-by injuries as employees try to rush through their tasks without taking appropriate safety precautions. TPM is working hard to ensure that employees receive the training and outreach they need to keep safety a number one priority.

### **Major Project Findings & Outcomes**

#### **Short-Term Outcomes and Findings:**

- One of our biggest and most exciting findings was the success resulting from the development of near miss policies and programs. This policy has enabled us to make many important impacts within manufacturing facilities – first, near miss policies educate workers about how to identify and report dangerous events or items that they come across, thereby creating a safer work environment due to increased awareness as well as workers taking personal initiative to address those issues. Second, near miss policies encourage safety discussions and partnership between workers and management. This partnership slowly, and over time, has shown to enhance safety cultures by making safety a daily priority that everybody supports – from the top-down and vice versa. All of these items combined have proven to reduce injuries throughout numerous companies that we spoke with during impact assessments. Companies are beginning to see less injuries as workers are given the tools and support necessary to embrace safety.
- An unexpected finding from the grant, was that injuries are often resulting due to stress and anxiety within the American manufacturing workforce. Due to the current economic stressors on manufacturers, most facilities are understaffed (due to lack of people to hire) and have higher product demand. This leads to a workforce constantly being pushed to work faster and accomplish more with less people. After almost every injury investigation or testimony, the injured employee noted that they overlooked safety in order to be more efficient, get the job done quicker and ensure that production goals were met. Examples of this include: not locking out/tagging out machinery when making a quick repair (in order to save time), crossing safety barriers to more quickly get to the other side of a piece of machinery, using improper tools (including their fingers!) to release jams, not properly replacing tools and not properly securing stacked lumber. TPM was able to help companies work on safety culture to reduce the urge to “cut corners” to work faster, and make production goals fit with workforce capabilities. This encouraged companies to see the link between pushing for speed and increased injuries, while also helping workers to see that skipping safety procedures can be

detrimental to their health and wellbeing (which would slow down production even more – which is what they were trying to avoid in the first place).

- Over the duration of the grant, staff was able to identify three injury trends and themes leading to the highest amounts of injuries; 1) safety oversights (or lack of training) regarding properly stacking and securing materials leads to multiple injuries from falling-objects; 2) workers did not have the understanding/ training on proper body placement to avoid injury and respect barriers/guarding (i.e., not standing between moveable pieces of equipment or belts and other non-moving objects); and 3) struck-by incidents involving rolling equipment (trucks, forklifts, etc.) were extremely common – incidents involving moving equipment were often times not even thought of as struck-by incidents, nor were they viewed with a mind to prevent future similar incidents. Often, the driver was faulted with no regard to the behaviors of the injured worker. These three trends enabled TPM staff to focus in on these areas to bring awareness and extra training to reduce injuries in all manufacturing facilities.
- TPM staff was able to shake up complacency and help to create safety cultures of proactive safety behaviors. With each new struck-by injury report brought to TPM, and subsequent accident investigation – trainers added the testimony and story to the training curriculum. Trainers were able to bring recent and relevant examples of injuries, using the same machinery as the workers at the next mill, to the front of employees' attention. A picture is worth a thousand words, and missing fingers, fractured bones and severed limbs can be a very powerful motivator for safety change.

Trainers worked to eliminate the “removed mindset” of employees – that an injury just wouldn’t happen to them – and proved to them that if safety procedures are not followed, they absolutely will happen. Workers consistently were shaken up and moved by the reality of risk within their environments. Trainers are beginning to see a change in mindset, of workers proactively taking safety responsibility, in order to prevent injuries. As trainings were completed, TPM received more and more calls asking for ideas or assistance with worker concerns brought to management. Workers wanted guidance on how to adopt engineering and administrative controls, procedural changes and PPE that could assist in making areas of concern into safer working environments.

- Essential to the success of struck-by training and outreach, was aiding companies in examining their unique facility layouts for trouble areas. There is no one-size fits all program or technique that will ensure safety for every manufacturer. TPM found a large blending of necessary techniques that need to be trained-on and identified to assist mills with reducing injuries. This consisted of a blend of behavioral training, increased or improved engineering controls and policy/procedural (administrative) controls. Each facility needs a unique blend of these three items – and TPM worked to create a safety formula that was most effective for each company based on their specific needs and facility layout. Safety solutions for struck-by and against hazards require a flexible and dynamic system of solutions.
- The app has proven to be an essential tool to bridging the generational gap between incoming new employees and older generational leaders. Instead of the traditional “do-as-your-told” safety mentality, the app enables young workers to take personal responsibility and interest in the safety within their work environments. This increased

attention to safety enables better communication of safety policies, risks and areas of concern between employees and management. Now workers and management can work hand in hand to enhance safety, instead of safety activities and attention being viewed as only a concern or discussion for management.

- TPM has documented behavioral safety processes being adopted by workers and management that actively include struck-by hazard awareness. This includes surveying the work environment for risks before beginning tasks for the day, proper use of PPE, managing one's own movement, staying behind barriers, staying out of the line of fire in high-risk areas and making sure guards are in place before operating equipment.
- TPM was also successful in the goal of first line of defense solutions being implemented for identified hazards. This has included PPE requirements being adopted in areas identified to be high-risk for struck-by accidents, written safety policies for being alert for and cautious of mill traffic – both by foot and vehicle, replacing worn out machine guarding, and emphasizing preventive maintenance programs.

*Additional Outcomes Achieved:*

- TPM found positive changes towards enhanced safety cultures that were beginning to recognize struck-by and against hazards as a standalone safety issue. Both staff and management were showing evidence of placing a priority on making the topic an essential element of the company's safety program, instead of a small unimportant piece of other safety topics that are misperceived as "more important."
- While still early in the grand scheme of "change influence", trainers received reports of reduction in injuries resulting from struck-by and against safety awareness. This was particularly evident among companies that implemented the near miss programs. As employees learn how to manage their behaviors in the workplace (e.g. being aware of internal traffic patterns), account for the identified risks around them and identify near misses, injuries are beginning to decline.
- TPM witnessed a few long-term solutions implemented – investing in facility design factors including new and modern machinery guarding being put into place, metal mesh net installation, roadway/pathway markings and the beginning of designs for internal traffic control programs.
- The majority of companies that engaged in impact assessment conversations noted that they were beginning to build an active partnership between workers and management to create a stronger safety program, safety culture and safety responsibility mindset.

<b>Measures to Judge Success:</b>
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- Impact Assessments – For the purpose of understanding the overall impact of the program, and ensuring correct safety changes and understanding of materials, an informal survey and on-site review was designed. Six to eight months following the training sessions, TPM contacted companies to informally discuss the various changes that were made within the facility and job procedures to reduce the risk of struck-by/against incidents. These assessments served as a means to gain a sense of the

effectiveness of the training program as well as assurance to members that TPM will continue being a resource on the topic of struck-by hazards.

Details of the impact assessments can be found above in “Major Project Findings and Outcomes.”

*An Additional Note on the Success of Near Miss Programs:*

During impact assessments, TPM reviewed the use of 10 near miss policies and their active use over the span of six – seven months. Reviewing the logs of near misses, there were a total of 22 reports across the ten companies. Many of the managers interviewed noted that, prior to the implementation of the near miss programs, workers had never before brought the company’s attention to an “almost safety accident.” Workers avoided talking about near misses because they did not want to seem as though they were doing their jobs incorrectly or “stir the pot” by calling out a safety issue. One manager specifically mentioned that he sees active engagement daily in the creation of safer work environments. He noted that employees speak up more in safety committee meetings, talk to them one-on-one about safety ideas and advocate for the safety of everyone within the facility.

- Progress was also measured via completion of deliverable training materials for each milestone (Training PPT) as well as by remaining on track with all stages of development for each of the other materials (such as the mobile app, JHA, etc.)
- One of the more technical tools TPM had for measuring success was Apple App Analytics. These statistics for the struck-by app demonstrated consistent usage and impressive outreach. Below are summary charts depicting app usage over the course of the grant.



**Chart Definitions:**

- Impressions: The number of times your app showed up on the App Store (via all searches for any type of app).
- Product Page Views: The number of times your app's App Store page has been viewed on devices with iOS 8 or tvOS 9, or later.
- App Units: The number of times your app's App Store page has been viewed on devices with iOS 8 or tvOS 9, or later.

**Relevant Processes and Lessons Learned:**

- Open communication and dialogue with a variety of businesses within a broad spectrum of health and safety awareness has been very valuable. The insight provided from businesses with rigorous safety programs has shown TPM various safety measures that work and others that don't. For example, one company gave detailed information on behavioral training and self-awareness (within a busy moving sawmill) to its employees and the company's injuries have decreased over the years. However, their efforts to simply implement verbal policies about safe working practices was ineffective – TPM could see where practical training integrated with policies is the best practice for changing safety behaviors. On the other hand, the businesses lacking in safety programs really need a “from the ground up” approach that starts with basic education about struck-by and against hazards and includes building a culture of safety along with bringing in new policies and engineering controls.
- Working closely with contractors from day one to clearly communicate timelines, expectations, funding and project goals has been beneficial to the overall development process of materials. TPM has found that open communication eliminates surprises or misunderstandings with contractors before they can snowball and become a larger issue. For example, our app contractor was not aware of a material approval delay which offset their original development schedule. However, since communication is so clear with each milestone step, TPM was able to help them adjust their scheduling to better suit the needs of this project as well as their project schedule.
- When working with third party app developers, request all account login data for both apple and android development platforms. Due to transfers in staff at Gravity Jack, TPM has spent time trying to back-track and find log-ins from previous developers that were never shared with TPM. This was an unexpected oversight that will not be allowed to occur again. The current grant app remains unaffected, but by knowing the importance of requesting all development activities from Gravity Jack, we can better protect the app investments of the SHIP grant program.
- Be willing to shift the presentation to suit the needs and culture of the company. TPM has found that each company requires just a little bit of adjusting when it comes to effective training delivery. Safety culture throughout manufacturing companies ranges from intensive compliance to complete disregard for safety policies and procedures – or worse yet, no safety policies in place.
- When working with weak safety company cultures, TPM presents the materials in a manner that advocates for building a new culture. This is done by demonstrating the benefits of safety, giving statistics and factual stories regarding injuries that happen within complacent safety environments. There is almost a safety sales tactic where TPM staff has to convince individuals to truly embrace the safety ideas being presented – assisting in setting a safety culture foundation. On the other hand, in good company safety cultures, TPM focuses more on enhancing what is already in place. Staff works to give employees the additional info needed above and beyond what they are already aware of and take their safety culture to the next level.
- Allow for natural conversation to flow between and among trainees and trainers. The more TPM staff pauses to listen to input, personal experiences with safety incidents and real-time concerns, the greater the training experience becomes. The more we actively

engage the workers, and take interest in their experiences, the more all of us can learn about near misses and methods to develop safer working habits.

- The app can lead to significant safety hazard identification through the use of multiple individuals analyzing a site. One set of eyes may identify a hazard that another worker or manager misses. Having a collaborative approach to safety, where everyone is responsible for the well-being of not only themselves, but all their colleagues, leads to greater personal investment and identification of risks.
- Over the life of the grant, TPM's biggest lesson and success was teamwork coordination. There are many people involved in the success of designing and developing materials and then going out into the field to provide hands-on training. The process of making sure each team member was informed and on-track, helped us to provide stronger training outreach, increased app usage and more engagement with workers throughout the state.

In previous projects, each element of the team (app developers, trainers, financial staff, etc.) tend to all be "siloeed" in their own tasks and activities within the grant. By removing the silo approach, and keeping the team informed and cohesive as a whole, we were able to accomplish goals faster, provide stronger product development and be more efficient with grant funds overall.

### **Product Dissemination:**

The Struck-By JHA App can be found in two app stores:

- [Google Store/Android](#)
- Apple Store/iOS - Not available right now

All materials produced under the project are in the process of being posted to TPM's website at [www.timberassociation.com](http://www.timberassociation.com) for the general population to access.

TPM staff worked daily to bring grant resources and materials to the companies that we visited. We encourage app downloads and provide hands-on guidance for the first use to demonstrate how beneficial the tool can be for making positive safety changes and identifying problem areas.

As a leader in safety and health management services in the timber industry, TPM has a vast network of connections and contacts throughout the Northwest—including both member companies and non-member companies. TPM prides itself in working with small businesses with at-risk workers in both rural and city areas throughout the state to provide the greatest amount of worker contact possible. This is done through the use of TPM's monthly newsletter, *The Bulletin*, which outlines training courses available, area training visit times and other pertinent training information. *The Bulletin* is sent out to over 450 industry subscribers. In addition to *The Bulletin*, TPM also has a bi-weekly e-News Brief that is used to notify the target audience of training opportunities and resources available. TPM also provides information to the industry regarding training availability through face-to-face contact, emails, phone calls and pamphlet mailings.

## Feedback:

The app has received positive reviews from users. Companies have appreciated the easy-to-access tools the app provides that enables them to immediately review positions via JHAs. The final report at the end of the app inspection tool has been well received – managers have noted the convenience of having a report that gives them the ability identify safety risks, solutions to those struck-by risks and guidance for next steps.

We can see that workers are beginning to use the hazard assessments in their various work environments and company safety officers are retaining the documentation and working to make safety changes to mitigate struck-by risks. The app has tied in nicely with TPM's effort to implement near miss programs as workers are able to identify what exactly entails a near miss as they analyze their work zones. Hazards (such as flying debris) were just seen as part of the daily risk – now they are being identified as near misses and the app is providing safety solutions/ideas for reducing those risks.

### Trainee Evaluation Results

(Random sample of paper and informal verbal evaluations.)

#### Result Methods

- For multiple choice questions - Results are represented by percent of employee responses per multiple choice answer.
- For rating scale questions – Results are an average of all of the ratings given.
- For free response questions – The respondents' comments are listed.

1. Did the training present safety information that you will be able to apply to current and future timber industry or manufacturing jobs?	<ul style="list-style-type: none"><li>• Yes – 100%</li><li>• No – 0%</li></ul>
2. The course material was (circle one):	<ul style="list-style-type: none"><li>• Totally new to me – 22%</li><li>• Mostly new to me – 35%</li><li>• Somewhat new to me – 23%</li><li>• Not new to me – 20%</li></ul>
3. Please rate the following course topic aspects (5=Very Useful through 1=Waste of Time)	PowerPoint Presentation – 4  Visual/Hands On – 5  Information Presented – 4.5
4. I feel well informed about precautions that workers can take to be best protected from hazards on the job (circle one):	<ul style="list-style-type: none"><li>• Strongly Agree – 80%</li><li>• Agree – 10%</li><li>• Neutral – 10%</li><li>• Disagree – 0%</li><li>• Strongly Disagree – 0%</li></ul>

5. The training progressed in a smooth and easy to follow presentation of information (circle one):	<ul style="list-style-type: none"> <li>• Strongly Agree – 65%</li> <li>• Agree – 25%</li> <li>• Neutral – 10%</li> <li>• Disagree – 0%</li> <li>• Strongly Disagree – 0%</li> </ul>
6. Would you recommend this course to other companies/employees, why or why not?	<ul style="list-style-type: none"> <li>• Yes – 100%</li> <li>• No – 0%</li> </ul> <p>Comments:</p> <ul style="list-style-type: none"> <li>• Hands-on training in my work area was very helpful, learned body placement techniques to avoid injury.</li> <li>• This was a good way to open my eyes to the reality of strike hazards, and the fact that they can be prevented instead of “dodged.”</li> <li>• This was a larger subject than I realized – I learned about swinging, rolling and falling hazards. I thought strike risks were just flying boards.</li> <li>• All mftg workers can benefit from this info – it opened my eyes to a lot of the risks I took for granted every day, and how easily they can be fixed.</li> </ul>
7. What information did you find to be the most valuable within the training?	<ul style="list-style-type: none"> <li>• Unsafe conditions vs unsafe behaviors – there are two elements to any incident. Made me realize I have the power to make safety changes.</li> <li>• The clear definition and detailed description/examples of the four types of strike risks was really helpful in understanding this topic as a whole.</li> <li>• Interesting to learn about the line of sight of truck drivers/forklifts/moving machinery operators – I didn’t realize how many blind spots there were. It was helpful to understand my safety responsibility as foot traffic.</li> <li>• My favorite part of this training was the JHA app. It was very helpful to have someone demonstrate how to analyze my work area for risks.</li> </ul>
8. Considering everything, how would you rate this course overall on a scale of 1 – 10, with 10 being the highest score):	<ul style="list-style-type: none"> <li>• 8</li> </ul>



## **Project's Promotion of Prevention:**

TPM brought struck-by and against hazard awareness to the forefront of safety programs by making the issue of strike hazards a standalone and essential safety topic for both management and workers. TPM worked to take struck-by risks from being a secondary training topic, to recognizing these hazards as one of the leading causes of fatalities and injuries in the industry.

TPM worked to produce materials and provide training and education to small businesses on methods to eliminate struck-by risks and provide awareness to workers. This guidance included struck-by and against job hazards found in individual worker positions, struck-by mitigation techniques (both engineering and administrative) and behavioral safety processes for actively avoiding struck-by accidents by recognizing and eliminating struck-by risk factors. Additionally, TPM successfully engaged company leadership to instill a sense of accountability regarding struck-by hazard prevention.

The key result of this project, in regards to preventing workplace injuries, illnesses and fatalities, was education about all types of struck-by/against hazards.

Through every step of this project from training, to safety policy design, to hands-on JHAs, companies and workers received an all-encompassing education on options and plans for preventing strike injuries and fatalities. Workers were given the resources needed to take them from a basic understanding of struck-by risks to fully developed knowledge of where strike hazards arise from and how to mitigate them before they even become an issue.

Workers and companies made changes to their facilities and procedures ranging from installing mesh nets to wearing proper PPE to revamping housekeeping procedures. Each change implemented within businesses throughout the state reduced the likelihood of another unnecessary injury incident. Every change made, whether large or small, is a proactive step forward in preventing injuries and fatalities that can occur from struck-by/against hazards.

## **Uses:**

One of the best uses resulting from this project is the ongoing resource of the mobile app. Companies are very interested in implementing the app as a managerial tool to continue proactive efforts in preventing struck-by incidents. The app can now be used by any worker to encourage regular JHAs to take place in order to identify strike risks – both old and new. As facilities are constantly changing, so too are struck-by risks, and the ability to run annual JHAs will help companies to continue reducing struck-by injuries.

Each of the safety resources produced is available to all manufacturing employers for use within their facilities. These tools were designed to enable businesses and supervisors to conduct independent assessments of their work environments on a regular basis. The training PPT also enable managers to provide refresh training or new-employee training as needed – maintaining a work environment that encourages struck-by awareness and safety precautions. Also, the sample near miss program will encourage workers to feel more comfortable reporting safety risks within their environments, thereby building a culture of increased safety.

While the focus of this grant project was on the timber industry, there is also a call for safety outreach and resources to other industries with similar issues. In order to provide safety

training and materials to all industries, TPM created the materials to be universal for all manufacturers. The smart phone app, mitigation solutions, sample near miss policy, and other educational resources can easily be adapted to any company within the state that struggles with struck-by hazards or needs education on the essentials of struck-by/against awareness and mitigation.

## **Organization Profile:**

Founded in 1916 as the Logger's Club, Timber Products Manufacturers Association (TPM) was organized by a group of Northwest lumbermen concerned with labor unrest and a manpower shortage in the industry. By 1918, the organization became a 501(c)6 non-profit known as TPM when the founders recognized the need for safety and human resource knowledge, skills and services within the industry.

Today, TPM's niche remains in the wood products industry and the association includes a diverse membership. TPM is proud to include sawmills, remanufacturers, loggers, wood products retailers, wholesalers and transportation companies among its membership. The heaviest concentration of TPM members reside in the Northwestern United States.

TPM's professional staff brings over 150 years of experience and knowledge to each of its member companies. Each of TPM's staff personnel specializes in a specific area of human resources, employee benefits or safety management in order to bring the highest caliber of expertise and commitment to our members.

TPM services are dedicated to the well-being and success of the companies it serves because TPM recognizes the importance of partnering with businesses to help them with their toughest safety and risk management challenges.

Mission: Serving the wood products industry by providing profitable and valuable business solutions.

### **Vision:**

- Working to be the wood products industry's leader in business management solutions, employee benefits, and optimizing relationships in all that we do.
- TPM's name will be synonymous with professionalism, integrity, education and quality services.
- TPM will become the innovative professional expert for the wood products industry by surpassing member expectations with products and services of outstanding value.
- TPM will provide the foundation for networking and contacts between members and the wood products industry.
- TPM's team of professionals will be equipped and empowered with the necessary tools to provide the highest quality of member services.
- TPM's dedication and commitment to the TPM Service Standards will ensure ongoing success for those we are privileged to serve.

## Additional Information

<b>Project Type</b> <input checked="" type="checkbox"/> Best Practice <input type="checkbox"/> Technical Innovation <input checked="" type="checkbox"/> Training and Education Development <input type="checkbox"/> Event <input type="checkbox"/> Intervention <input type="checkbox"/> Research <input type="checkbox"/> Return to Work <input type="checkbox"/> Other (Explain):	<b>Industry Classification</b> (check industry(s) this project reached directly ) <input type="checkbox"/> 11 Agriculture, Forestry, Fishing and Hunting <input type="checkbox"/> 21 Mining <input type="checkbox"/> 22 Utilities <input type="checkbox"/> 23 Construction <input checked="" type="checkbox"/> 31-33 Manufacturing <input type="checkbox"/> 42 Wholesale Trade <input type="checkbox"/> 44-45 Retail Trade <input type="checkbox"/> 48-49 Transportation and Warehousing <input type="checkbox"/> 51 Information <input type="checkbox"/> 52 Finance and Insurance <input type="checkbox"/> 53 Real Estate and Rental and Leasing <input type="checkbox"/> 54 Professional, Scientific, and Technical Services <input type="checkbox"/> 55 Management of Companies and Enterprises <input type="checkbox"/> 56 Administrative and Support and Waste Management and Remediation Services <input type="checkbox"/> 61 Educational Services <input type="checkbox"/> 62 Health Care and Social Assistance <input type="checkbox"/> 71 Arts, Entertainment, and Recreation <input type="checkbox"/> 72 Accommodation and Food Services <input type="checkbox"/> 81 Other Services (except Public Administration) <input type="checkbox"/> 92 Public Administration														
<b>Target Audience:</b> Manufacturing companies and their employees. Small and hard to reach businesses.															
<b>Languages:</b> English															
<b>Please provide the following information - -</b> <i>(information may not apply to all projects)</i>	<b>List, by number above, industries that project products could potentially be applied to.</b> 31-33														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%;"><i># classes/events:</i></td> <td></td> </tr> <tr> <td><i># hours trained</i></td> <td></td> </tr> <tr> <td><i># students under 18</i></td> <td></td> </tr> <tr> <td><i># workers</i></td> <td></td> </tr> <tr> <td><i># companies represented</i></td> <td></td> </tr> <tr> <td><i># reached (if awareness activities)</i></td> <td></td> </tr> <tr> <td><b>Total reached</b></td> <td></td> </tr> </table>	<i># classes/events:</i>		<i># hours trained</i>		<i># students under 18</i>		<i># workers</i>		<i># companies represented</i>		<i># reached (if awareness activities)</i>		<b>Total reached</b>		<b>Potential impact (in number of persons or companies) after life of project?</b> Unlimited
<i># classes/events:</i>															
<i># hours trained</i>															
<i># students under 18</i>															
<i># workers</i>															
<i># companies represented</i>															
<i># reached (if awareness activities)</i>															
<b>Total reached</b>															
<b>Have there been requests for project products from external sources?</b> Yes <i>If Yes, please indicate sources of requests:</i> The app has been searched out and downloaded on both app stores (Google and Apple) by many external sources.															

PART II

*Financial Information  
Budget Summary*

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<b>Project Title:</b>	Striking Down Workplace Injuries – Struck (By and Against): Proactive and Dedicated Safety Awareness & Mitigation Solutions		
<b>Project #:</b>	2017ZB00348	<b>Report Date:</b>	3/6/2020
<b>Contact Person:</b>	Latitia Estrada	<b>Contact #:</b>	509-550-9221
<b>Start Date:</b>	4/1/2018	<b>Completion Date:</b>	3/6/2020

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1.	<b>Total original budget for the project</b>	\$ 150,000
2.	<b>Total original SHIP Grant Award</b>	\$ 150,000
3.	<b>Total of SHIP Funds Used</b>	\$ 142,897.41
4.	<b>Budget Modifications (= or - if applicable)</b>	\$ 0
5.	<b>Total In-kind contributions</b>	\$ <u>0</u>
6.	<b>Total Expenditures (lines 3+4+5)</b>	\$ <u>142,897.41</u>

Instructions:

- Complete the Supplemental Schedule (Budget) form first (on the next page).
- The final report must include all expenditures from date of completion of interim report through termination date of grant.
- Indicate period covered by report by specifying the inclusive dates.
- Report and itemize all expenditures during specified reporting period per the attached supplemental schedule.
- Forms must be signed by authorized person (see last page).
- Forward one copy of the report to **Grant Manager Name, SHIP Grant Manager at PO Box 44612, Olympia, WA 98504-4612**

PART II (Continued)

Financial Information  
Supplemental Schedules (Budget)

<b>Project Title:</b>	Striking Down Workplace Injuries – Struck (By and Against): Proactive and Dedicated Safety Awareness & Mitigation Solutions		
<b>Project #:</b>	2017ZB00348	<b>Report Date:</b>	3/6/2020
<b>Contact Person:</b>	Latitia Estrada	<b>Contact #:</b>	509-550-9221
<b>Total Awarded:</b>	\$150,000		

**ITEMIZED BUDGET:** How were SHIP award funds used to achieve the purpose of your project?

	Budgeted for Project	Amount Paid Out	Difference
<b>A. PERSONNEL</b>	\$65,493.60	\$70,770.80	-\$5,277.20
Explanation for Difference and other relevant information: The difference in this category is due to the no-cost time extension. TPM was given permission to continue grant activities due to the general underspending of the grant throughout the original grant timeline. Funds were underutilized in other categories, which enabled us to expand the personnel budget.			

	Budgeted for Project	Amount Paid Out	Difference
<b>B. SUBCONTRACTOR</b>	\$39,000.00	\$49,616.00	-\$10,616.00
Explanation for Difference and other relevant information: TPM requested additional money to be spent on contractors in order to purchase an “App Retainer” with Gravity Jack. This will assist with app upkeep at the mobile marketplace digital requirements change and/or cause the app to age out of the store.			

	Budgeted for Project	Amount Paid Out	Difference
<b>C. TRAVEL</b>	\$25,900.00	\$7,528.54	\$18,371.46
Explanation for Difference and other relevant information: TPM works hard to keep travel costs low by following per diem requirements and making the best use of funds. Travel within the state was less costly than originally anticipated. Less airline travel was required due to ease of travel via car. Also, less overnight stays were needed than planned which eliminated a large amount of lodging costs.			

	Budgeted for Project	Amount Paid Out	Difference
<b>D. SUPPLIES</b>	\$3,198.00	\$10,426.46	-\$7,228.46
Explanation for Difference and other relevant information: TPM requested to use funds for renewing “GoToTraining” – the online webinar training platform as well as a replacement projector and traveling laptop (which stopped working) for PPT trainings and workers to use for hands-on training and interaction with digital JHAs. The items purchased were necessary to overall outreach efforts and aided TPM in providing effective training and transfer of knowledge on struck-by safety. (These items may have likely been better suited to the “Other” budget category that TPM included, but also fit the functionality of the supplies category.) This also accounts for general training printouts and office supplies.			

	Budgeted for Project	Amount Paid Out	Difference
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<b>E. PUBLICATIONS</b>	\$1,300.00	\$582.05	\$717.95
Explanation for Difference and other relevant information:			

	Budgeted for Project	Amount Paid Out	Difference
<b>F. OTHER</b>	\$15,108.40	\$3,973.56	\$11,134.84
Explanation for Difference and other relevant information:			

	Budgeted for Project	Amount Paid Out	Difference
<b>TOTAL DIRECT COSTS</b>	\$150,000	\$142,897.41	\$7,102.59
	Budgeted for Project	Amount Paid Out	Difference
<b>TOTAL INDIRECT COSTS</b>	0	0	0
	Budgeted for Project	Amount Paid Out	Difference
<b>TOTAL SHIP BUDGET</b>	\$150,000	\$142,897.41	\$7,102.59

	Budgeted for Project	Amount Paid Out	Difference
<b>G. IN-KIND</b>	0	0	0
Explanation for Difference and other relevant information:			

I hereby certify that the expenditures listed on this report were made with my approval:

Date	Signature of Project Manager
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PART III  
***Attachments:***

1. Struck-By/Against (JHA Tool) Smart Phone Application (App) for both iOS and Android,
2. Striking Down Injuries – Struck-by and Against Safety Awareness Training – PPT Presentation with Quiz and Employee Worksheet
3. Sample Policy and Program for Reporting Near Misses
4. Near Miss Incident Investigation Guide
5. Struck-by and Against Safety Committee Meeting Informational Sheet.

**REMINDER!!:** All products produced, whether by the grantee or a subcontractor to the grantee, as a result of a SHIP grant are in the public domain and cannot be copyrighted, patented, claimed as trade secrets, or otherwise restricted in any way.