SAFETY AND HEALTH INVESTMENT PROJECTS
FINAL REPORT

Combustible Dust Mitigation Solutions
2014ZB00282
11/17/2014 – 8/31/2016

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Timber Products Manufacturers Association (TPM)

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Washington State Department of Labor & Industries
Division of Occupational Safety and Health

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PART I

Narrative Report

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.

ABSTRACT

The focus of this project was to design Combustible Dust Mitigation Solutions in order to bridge the gap between hazardous dust awareness and actively eliminating risk through effective mitigation programs.

Combustible dust continues to be a serious hazard for workers as fires, explosions and deflagrations continue to occur in manufacturing facilities. While most manufacturers that produce fine dust are aware of the safety hazards regarding combustible dust, the actual knowledge of steps to implement best practices for dust control and proper mitigation techniques is lacking. Businesses and workers are missing essential tools and guidance regarding proper prevention of dust accumulation, elimination of ignition sources and information regarding application of that knowledge to daily work activities and housekeeping procedures.

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

During the life of the grant TPM:

- Developed three high quality dynamic training tools:
    1. Combustible Dust Smart Phone Application (App) for both iOS and Android,
    2. Combustible Dust Overview and Mitigation Solutions Training PowerPoint, and
    3. Combustible Dust Hazard Mitigation Sample Policy & Inspection Checklist.
- Provided outreach to 32 unique businesses.
- Trained 347 supervisors, business owners and workers.
- Provided 18 facility hazard assessments.

Major findings:

- The top method elected for dust mitigation was administrative controls such as enhanced housekeeping procedures to prevent dust accumulation.
- Non-visible areas consistently go unchecked and accumulate hazardous levels of dust, thereby creating ideal environments for potential explosions – over 65% of hazard assessments completed showed dust in rafters, built up in machinery and caught behind electrical outlets.
- Employee mindsets and company cultures are embracing combustible dust safety. TPM noticed an increase in general safety knowledge as well as willingness to be proactive regarding dust control.
- Essential to the success of dust mitigation 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 dust producing manufacturer.
- The availability of an easily accessible app was appealing to most supervisors and greatly aided TPM with company buy-in for providing top-down knowledge transfer and safety actions to mitigate dust accumulation.

PURPOSE OF PROJECT

The purpose of this project was to provide businesses and employees with the tools and training necessary to bridge the gap between combustible dust awareness and the next steps to take for effective mitigation of fugitive dust. Essentially, TPM is working to guide companies to

making the most effective and efficient combustible dust mitigation choices for their facilities in order to reduce and/or eliminate incidents of dust related fires and explosions.

TPM's plan consisted of moving from recognition to elimination – providing solutions to recognized hazards. Through working in the manufacturing field, TPM found that people are aware of the issue and hold a basic understanding of combustible dust, but are unsure of how exactly to address the risks and mitigate them. This lack of safety knowledge is leading to hazardous work environments with fugitive dust accumulations that place facilities and workers at risk for dust deflagrations, explosions and fires.

TPM's plan consisted of designing dynamic combustible dust mitigation tools and techniques that are effective, as well as easy to adopt and implement, within wood product facilities (as well as other dust producing manufacturers.) These tools will provide management with a variety of strategies to eliminate risks while also providing workers with guidance, procedures and safety buy-in to follow through with the mitigation techniques once they are implemented. Being dynamic, these tools will be interactive and capable of aiding workers with both recognizing and eliminating potential fugitive dust and ignition sources.

TPM's overarching goal consisted of offering companies with at-risk workers in high-hazard industries a program on combustible dust, its multiple safety hazards, and viable resources to eliminating this hazard.

TPM strove to aid in increasing participant safety and bringing facilities into safety compliance by:

- using a top-down approach that begins with management and flows to employees in a total company educational process;
- providing effective tools and training for the purpose of making work environments safer by helping companies develop effective safety programs to mitigate combustible dust accumulation and ignition sources in order to save lives;
- using individualized wood dust mitigation strategies and educational materials via a full work-environment inspection that will reveal areas within plants that put companies and workers at risk for combustible dust explosions;
- enhancing the safety culture of companies by emphasizing the importance of proper control programs, housekeeping techniques for fugitive dust and personal safety practices;
- increasing industry acceptance of dust hazards and changing mindsets to encourage proper housekeeping and general awareness;
- providing the industry with an understanding of state and federal regulations through the use of effective adult-based education techniques.

STATEMENT AND EVIDENCE OF THE RESULTS

General Overview

The grant project was a strong success as TPM safety staff was able to develop meaningful tools and resources, provide direct outreach to businesses and workers, and directly aid in implementing dust control programs.

TPM is proud to have developed a beneficial safety program for dust producing 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 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.

In the past year alone, TPM has witnessed tangible positive changes in the timber industry with regards to safety programs and worker attitudes towards combustible dust. TPM's trainers have worked to build up the industry's small business safety awareness with the goal and mindset of reducing dust accumulation and dust-related incidents among wood products manufacturers.

Project Tasks Accomplished:

Project Deliverables	**Estimated/Planned Results**	**Actual Results**	**Percent Accomplished**
Design 3 Safety Tools/Materials	3	3	100%
Individual Company Training Events	25	32	128%
Facility Hazard Assessments by TPM Safety Personnel	15	18	120%
Workers and Managers Trained	250	347	138%
Combustible Dust App Users	N/A	1,229	N/A

Safety Items Designed and Developed

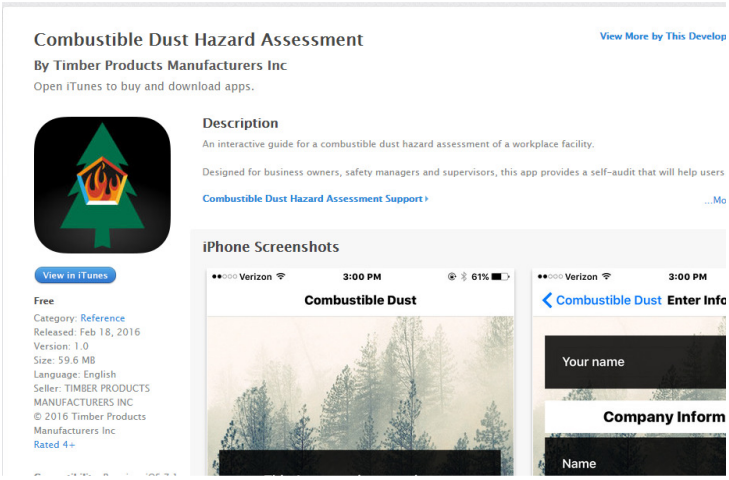
The materials produced and the training conducted was designed to lead to a top-down safety approach that provides an all-encompassing safety strategy for building a safe work environment. By ensuring management's understanding of the topic, a company is better able to implement new safety policies and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

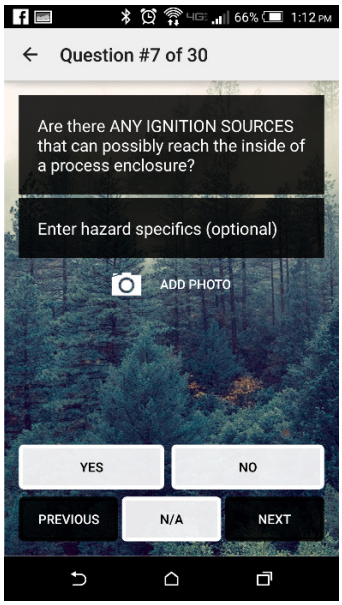
Tools and Training Developed:

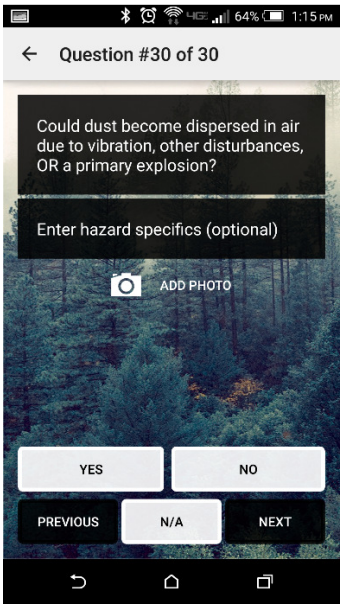
1. Combustible Dust Smart Phone Application (App) for both iOS and Android – This app provides employers with a hands-on, interactive facility audit to help identify dust hazards and mitigation techniques throughout a facility. There is a camera function that enables the option of inserting photos of key trouble areas and, upon completion of the audit, the app provides users with a full hazard assessment report including mitigation options/methods. The app also provides links and resources for additional combustible dust information.

   App in-store page:



   Images of app:





2. Combustible Dust Overview and Mitigation Solutions Training PowerPoint – The presentation is an in-depth look into what combustible dust is, ignition sources, cost-effective mitigation solutions, hazard assessment highlights, etc. The presentation educates workers on: 1) how to assess whether dust is combustible; 2) how to determine where dust is created and the highest areas of risk in a facility; and 3) how to mitigate dust accumulation.

The slides take individuals through the "nuts and bolts" of combustible dust then walk them through how to reduce risk within their own facilities and day to day activities.

The presentation is 42 slides long and is an all-encompassing educational tool in regards to combustible dust.

3. Combustible Dust Hazard Mitigation Sample Policy & Inspection Checklist – This Combustible Dust Safety Policy is intended to establish uniform requirements designed to safeguard the safety of employees and protect property from combustible dust fires and explosions. This program also ensures that dust, ignition source, and injury/damage control measures are carried out to minimize the possibility of injury to employees or damage to property.

Trainings

A total of 347 workers and managers were trained. Trainers strove to make training interactive by engaging employees in discussion regarding their experiences with combustible dust and challenging them to identify areas within their work environments that could collect fugitive dust.

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
5. Industry Conferences

Facility Hazard Assessments

TPM safety staff completed a total of 18 hazard assessments throughout the state.

Designed as a detailed facility overview, the hazard assessment is one of the most important outreach efforts that TPM provided. The assessment consisted of a full work environment inspection that enables businesses to discover the areas within their plants that put them at risk for combustible dust explosions. The inspection ensured that each facility's unique needs were met, observed and analyzed for risk. The assessment consisted of a TPM trainer taking owners and supervisors throughout the facility to analyze open areas, hidden areas, hazardous materials, ignition sources, air disbursement sources, facility processes, machinery, facility design and many other factors for dust.

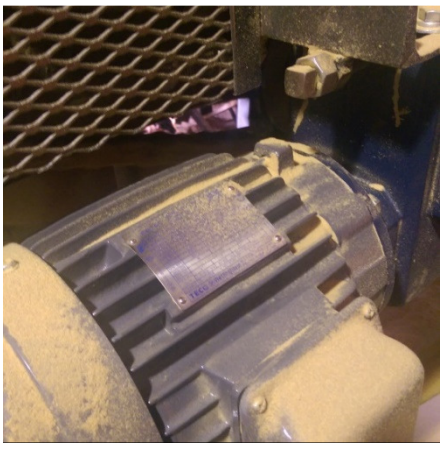
These hands-on inspections enabled companies to make essential changes to their work procedures and housekeeping policies in order to minimize fugitive dust and keep employees safe. Companies implemented additional cleaning intervals and made monthly checklists for monitoring and controlling dust build up in machinery, rafters and other non-visible areas. Other companies switched out high-heat light fixtures to eliminate ignition sources, installed

vacuum systems and/or ceased using forced-air blowdowns as a cleaning method in order to prevent dust dispersion.

Examples of combustible dust found during assessments:

(Sawmill – chipper area)

(Sawmill shop)



(Sawmill – dust accumulation on machinery)

Major Project Findings & Outcomes

Major findings:

- The top method elected for dust mitigation was administrative controls such as enhanced housekeeping procedures to prevent dust accumulation and increased clean-up intervals.
- Removal and/or awareness of ignition sources was another popular effort for reducing the chance of a combustible dust incident. Exposed wiring and electrical panels were properly covered, kiln areas were analyzed and procedures for safe clean-up implemented, high-heat light fixtures were replaced, and hot work permit requirements were set-up.

- Non-visible areas consistently go unchecked and accumulate hazardous levels of dust, thereby creating ideal environments for potential explosions – over 65% of hazard assessments completed showed dust in rafters, built up in machinery and caught behind electrical outlets.
- Employee mindsets and company cultures are embracing combustible dust safety. TPM noticed an increase in general safety knowledge as well as willingness to be proactive regarding dust control.
- Essential to the success of dust mitigation 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 dust producing manufacturer.
- The availability of an easily accessible app was appealing to most supervisors and greatly aided TPM with company buy-in for providing top-down knowledge transfer and safety actions to mitigate dust accumulation.
- High level engineering controls such as spark/ember detection and extinguishing systems, different machinery layouts, building redesign, new ventilation systems, installation of vacuum system and purchasing of central dust collection systems were discussed but not typically in operating budgets. Most companies find technical engineering solutions to be cost prohibitive and are therefore underutilized. Some businesses are implementing fans and vacuum systems slowly, as they are able to fund them. Others are completely unable to afford these types of mitigation solutions.

  Companies are seeking an affordable, effective and easily implementable program for combustible dust mitigation throughout their facilities. The ideal solution for small businesses would include a blend of technical solutions and clean-up methods.

Additional Outcomes Achieved:

- Worker knowledge and comprehension of mitigation options and solutions for their work environments. Employees are now able to apply best practices to their daily job duties and work towards creating safer working conditions.
- Employer “buy-in” of the importance of mitigating combustible dust hazards and decreasing fugitive dust. The supervisors that were interviewed post-training made note of the fact that the issue of dust within their facilities was a priority.
- A noticeable decrease in fugitive dust and wood dust accumulation through the implementation of dust control solutions was made evident in both on-site visits as well as discussions with company leaders over the phone.
- The implementation and consistent use of new policies was also observed. The companies that TPM personnel spoke with post-training, all of them had either completed or begun the process of implementing a Combustible Dust Safety Policy as part of their safety program.

MEASURES TO JUDGE SUCCESS

One of the best tools TPM had for measuring success was Google Analytics. These statistics for the combustible dust app demonstrated high usage and impressive outreach. Below are summary charts and graphs depicting app usage over the course of the grant.

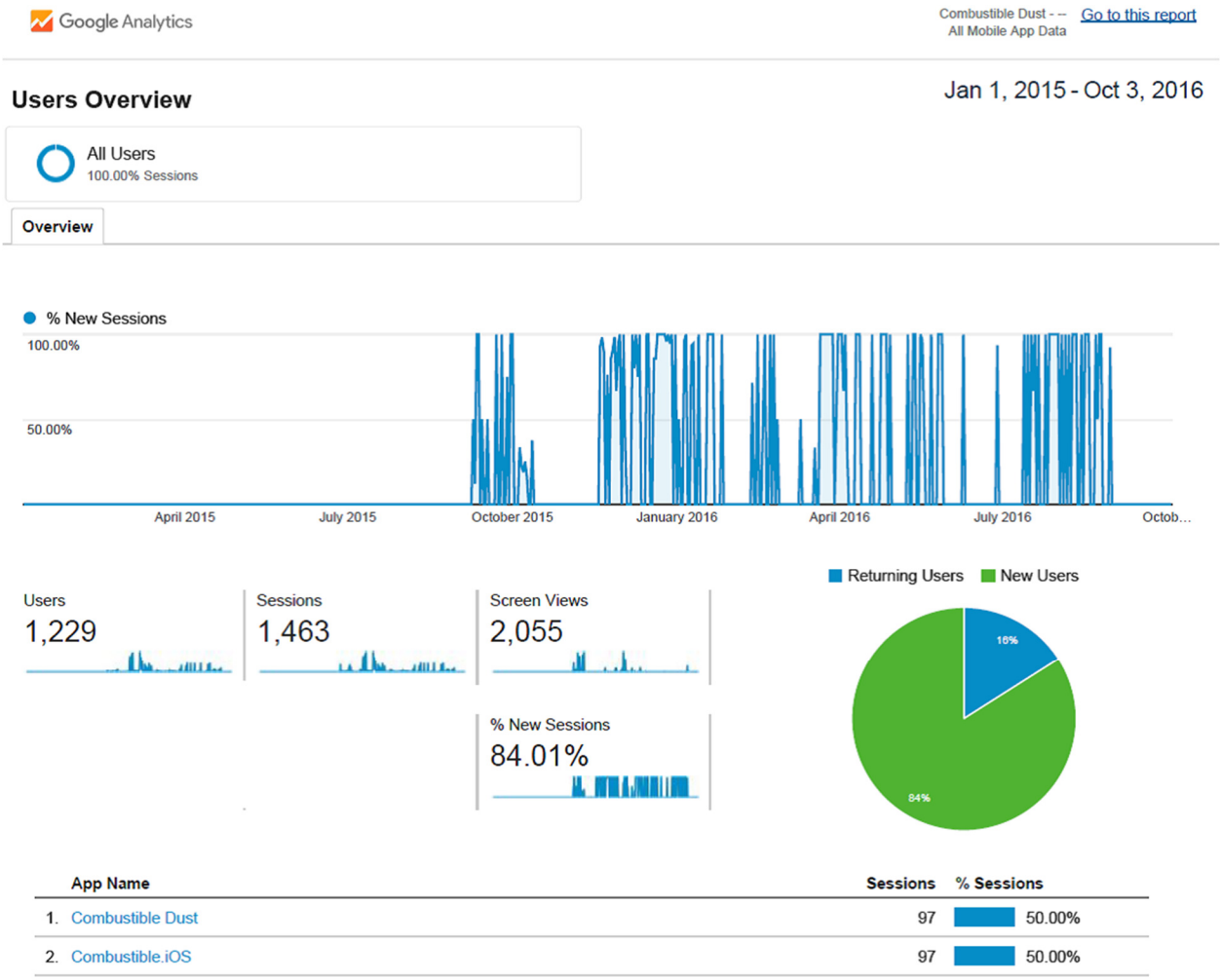


Chart Definitions:

- *Users*: Users that have had at least one session within the selected date range. Includes both new and returning users.
- *Sessions*: Total number of Sessions within the date range. A session is the period of time a user is actively engaged with the app. All usage data (Screen Views, Events, Ecommerce, etc.) is associated with a session.
- *Screen Views*: The total number of screens viewed. Repeated views of a single screen are counted.
- *% New Sessions*: An estimate of the percentage of first time visits.

Impact Assessments – For the purpose of understanding the overall impact of the program, and ensuring correct facility 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 fill out a survey detailing changes that were made within the facility to abate combustible dust hazards. The surveys 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 combustible dust.

Details of the impact assessments can be found above in "Measures to Judge Success."

RELEVANT PROCESSES AND LESSONS LEARNED

- Early in the project, TPM learned that it was necessary and beneficial to keep the research phase of the grant open throughout the life of the grant. Research does not have a simple starting and stopping point; the more thought and trial and error that went into the grant, the greater the end product became.

- During the last few months of the grant, TPM was able to gather valuable information and knowledge regarding the impact of the project on employees' safety and health habits after receiving training. TPM has had experience gathering this type of data in the past, but learned that one of the best ways to truly see impact demonstrated in a tangible way, is to visit the sites of trained companies and witness the changes made to housekeeping practices, blow-down techniques, light fixture choices, etc. TPM staff found that the more interaction they had with workers, the higher the quality of data collected became.

- When training groups of employees, engaging workers by referencing their specific work environments tends to lead to insights into high risk areas that tend to be overlooked. For example, when talking to workers from a sawmill, a trainer asked employees about their day-to-day job duties and use of machinery. As workers opened up about their daily activities, they were able to pinpoint where dust collects the most frequently – beneath sawblades with machine guarding (which prevents workers from seeing beneath and around the blade), and along rafters after equipment is "blown-down" to remove dust (thereby dispersing the dust to settle elsewhere and not actually addressing the hazard.) These revelations opened workers' eyes to the daily combustible dust hazards around them that go overlooked and enabled TPM to guide them to mitigation solutions.

- TPM found that the addition of the published app to the training was extremely beneficial in engaging trainees in an interactive learning process. By placing a tool in their hands to work with, workers were able to receive a more personalized learning experience as they moved through a hazard assessment questionnaire relevant to their own work stations and areas. These trainees were then able to receive a higher transfer of knowledge to move forward into their day-to-day work activities with. The app also opened up an increased level of communication between the trainer and the trainees as well as amongst the trainees. Being able to provide a tangible tool as a learning activity was extremely beneficial to the overall learning experience.

- Restructuring of app development – TPM learned that app development is most effectively executed with the assistance of a software and development specialist.

  Originally, TPM planned to use a pre-fabricated platform to develop the Combustible Dust App – a pre-built source that TPM could insert information into. However, TPM

quickly found that pre-made products were not sufficient to make a quality, top of the line safety app. The platforms available were not serving the nature of the grant goals due to the fact that TPM designed the app to be a functional tool – not just an informational resource.

When this problem was recognized, staff worked swiftly to research alternative development methods. TPM staff spoke in depth with other manufacturers of safety apps to gain insight as to the most beneficial route to use in developing an app. TPM's goal was to ensure that the right choice was made, in terms of a grant modification, in order to provide a top of the line safety app that served the purpose of the grant project.

In order to design an app that had all the usability and functionality needed to provide meaningful safety guidance, TPM hired the assistance of a professional app developer to handle software design and coding. This developer has the experience needed for dealing with both Apple and Android for launching the app on each app system. The expertise of the developer enabled TPM to keep the grant timeline on track and ensured that the product was completed on time.

The aid of an app developer has proven to be extremely time-saving and has made for a more technically sound app design. The app will now provide users with an enhanced realm of information and technical help in the field of combustible dust safety. Ultimately, the choice to work with an app developer enabled TPM to develop a safety app of the highest caliber in order to provide companies with a highly effective combustible dust mitigation tool that can be used for many years to come.

PRODUCT DISSEMINATION

The Combustible Dust App can be found in two app stores:

- Google Store/Android - http://bit.ly/24wff3S
- Apple Store/iOS - http://apple.co/1UwIKjf

All materials produced under the project are posted to TPM's website at www.timberassociation.com for the general population to access.

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 enable them to immediately address and mitigate dust issues. 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 proper mitigation techniques and guidance for next steps.

Trainee Evaluation Results
(Random sample of paper 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?	• Yes – 100% • No – 0%
2. The course material was (circle one):	• Totally new to me – 10% • Mostly new to me – 40% • Somewhat new to me – 25% • Not new to me – 25%
3. Please rate the following course topic aspects (5=Very Useful through 1=Waste of Time)	PowerPoint Presentation – 4.5 Visual/Hands On – 3 Information Presented – 4.1
4. I feel well informed about precautions that workers can take to be best protected from hazards on the job (circle one):	• Strongly Agree – 75% • Agree – 20% • Neutral – 5% • Disagree – 0% • Strongly Disagree – 0%
5. The training progressed in a smooth and easy to follow presentation of information (circle one):	• Strongly Agree – 50% • Agree – 30% • Neutral – 20% • Disagree – 0% • Strongly Disagree – 0%

6. Would you recommend this course to other companies/employees, why or why not?	• Yes – 100% • No – 0% Comments: • Housekeeping tips were helpful. • Good reminder about how quickly dust accumulates all over a plant. • The app will be used to provide guidance on our next steps for safety plans. • Helpful review about the dangers of com dust.
7. What information did you find to be the most valuable within the training?	• Ignition sources that are not obvious – welding during maintenance, electrical panels, forklifts. • Steps for designing safety program. • Affordable solutions like housekeeping and not using compressed air for cleaning. • Stories about past explosions and how they occurred.
8. Considering everything, how would you rate this course overall on a scale of 1 – 10, with 10 being the highest score):	• 8.5

PROJECT PROMOTION OF PREVENTION

The key result of this project, in regards to preventing workplace injuries, illnesses and fatalities, was education about fugitive dust mitigation methods.

Through every step of this project from training, to safety policy design, to hands-on facility assessments, companies and workers received an all-encompassing education on options and plans for preventing combustible dust fires, explosions and deflagrations. Workers were given the resources needed to take them from a basic understanding of dust to a full-scale dust mitigation program.

Workers and companies made changes to their facilities and procedures ranging from revamping housekeeping procedures to removing ignition sources. Each change implemented within businesses throughout the state reduced the likelihood of a catastrophic combustible dust incident. Every change made, whether large or small, is a proactive step forward in preventing injuries and fatalities that can occur from fugitive combustible dust.

USES

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. Also, the sample combustible dust safety program/policy will enable employers to choose which mitigation methods work best for their unique facilities and establish steps to manage dust on a daily basis.

The tools provide best practices for dust mitigation as well as a separate emphasis on safe clean-up procedures. They provide guidance on how to establish an active and dynamic policy to guide workers regarding safe dust control procedures indefinitely.

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 that generate combustible dust, TPM created the materials to be universal for all industries. Manufacturers of coal, starch, grain, metal, etc. will all be able to use the safety resources to reduce fugitive dust and enhance safety within their environments. The smart phone app, mitigation solutions, sample policy, Hazard Facility Assessment and other educational resources can easily be adapted to any company within the state that struggles with mitigating combustible dust or needs education on the essentials of dust safety.

Additional Information

Project Type

- ☒ Best Practice
- ☐ Technical Innovation
- ☒ Training and Education Development
- ☐ Event
- ☐ Intervention
- ☐ Research
- ☐ Return to Work
- ☐ Other (Explain):

Target Audience: Combustible dust producing manufacturing companies and their employees. Small and hard to reach businesses.

Languages: English

Industry Classification (check industry(s) this project reached directly)

- ☐ 11 Agriculture, Forestry, Fishing and Hunting
- ☐ 21 Mining
- ☐ 22 Utilities
- ☐ 23 Construction
- ☒ 31-33 Manufacturing
- ☐ 42 Wholesale Trade
- ☐ 44-45 Retail Trade
- ☐ 48-49 Transportation and Warehousing
- ☐ 51 Information
- ☐ 52 Finance and Insurance
- ☐ 53 Real Estate and Rental and Leasing
- ☐ 54 Professional, Scientific, and Technical Services
- ☐ 55 Management of Companies and Enterprises
- ☐ 56 Administrative and Support and Waste Management and Remediation Services
- ☐ 61 Educational Services
- ☐ 62 Health Care and Social Assistance
- ☐ 71 Arts, Entertainment, and Recreation
- ☐ 72 Accommodation and Food Services
- ☐ 81 Other Services (except Public Administration)
- ☐ 92 Public Administration

Please provide the following information - - *(information may not apply to all projects)*

# classes/events:	
# hours trained	
# students under 18	
# workers	
# companies represented	
# reached (if awareness activities)	
Total reached	

List, by number above, industries that project products could potentially be applied to.
31-33

Potential impact (in number of persons or companies) after life of project?
Unlimited

Have there been requests for project products from external sources? Yes

If Yes, please indicate sources of requests: 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

Project Title:	Combustible Dust Mitigation Solutions		
Project #:	2014ZB00282	**Report Date:**	10/10/2016
Contact Person:	Latitia Estrada	**Contact #:**	509-535-4646
Start Date:	11/17/2014	**Completion Date:**	8/31/2016

1.	**Total original budget for the project**	$ 175,643.60
2.	**Total original SHIP Grant Award**	$ 175,643.60
3.	**Total of SHIP Funds Used**	$ 153,993.63
4.	**Budget Modifications (= or - if applicable)**	$ 0.00
5.	**Total In-kind contributions**	$ 0.00
6.	**Total Expenditures (lines 3+4+5)**	$ 153,993.63

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 Anar Imin**, SHIP Grant Manager** at **PO Box 44612, Olympia, WA 98504-4612**

PART II *(Continued)*

Financial Information
Supplemental Schedules (Budget)

Project Title:	Combustible Dust Mitigation Solutions		
Project #:	2014ZB00282	**Report Date:**	10/10/2016
Contact Person:	Latitia Estrada	**Contact #:**	509-535-4646
Total Awarded:	175,643.60		

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

	Budgeted for Project	Amount Paid Out	Difference
A. PERSONNEL	84,692.00	87,216.17	-2,524.17
Explanation for Difference and other relevant information:			

	Budgeted for Project	Amount Paid Out	Difference
B. SUBCONTRACTOR	43,000.00	39,200.00	3,800.00
Explanation for Difference and other relevant information:			

	Budgeted for Project	Amount Paid Out	Difference
C. TRAVEL	25,630.00	11,229.93	14,400.07
Explanation for Difference and other relevant information: 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
D. SUPPLIES	6,160.00	4,174.22	1,985.78
Explanation for Difference and other relevant information:			

	Budgeted for Project	Amount Paid Out	Difference
E. PUBLICATIONS	4,322.00	0	4,322.00
Explanation for Difference and other relevant information: Publications ended up being digital and did not require paper, ink or other tangible item costs.			

	Budgeted for Project	Amount Paid Out	Difference
F. OTHER	11,839.60	12,113.31	-273.71
Explanation for Difference and other relevant information:			

	Budgeted for Project	Amount Paid Out	Difference
TOTAL DIRECT COSTS	175,643.60	153,933.63	21,709.97
	Budgeted for Project	Amount Paid Out	Difference
TOTAL INDIRECT COSTS	0	0	0
	Budgeted for Project	Amount Paid Out	Difference
TOTAL SHIP BUDGET	175,643.60	153,993.63	21,709.97

	Budgeted for Project	Amount Paid Out	Difference

G. IN-KIND	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:

10/10/2016	Latitia Estrada
Date	Signature of Project Manager

PART III
Attachments:

1. Combustible Dust Smart Phone Application (App) for both iOS and Android,
2. Combustible Dust Overview and Mitigation Solutions Training PowerPoint, and
3. Combustible Dust Hazard Mitigation Sample Policy & Inspection Checklist.