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THE CENTER FOR CONSTRUCTION RESEARCH AND TRAINING

SUCCESSFUL R2P PARTNERSHIPS IN CONSTRUCTION SAFETY AND HEALTH:

ASPHALT PAVING PARTNERSHIP

SUMMARY

BACKGROUND

In the early 1990s a debate was raging about the health hazards of asphalt fumes and whether they would be classified as a human carcinogen. Amid this controversy an unlikely partnership was born. Representatives from government agencies, labor, and the asphalt industry, each of whom believed that they had the science on their side, decided to look beyond their differences and instead work together to reduce worker exposures to fumes in the asphalt paving industry. This new partnership led to the development, testing and adoption of engineering controls for asphalt pavers as well as continued, long-term collaboration for research to practice in additional areas of health and safety.

WHAT HAS THE PARTNERSHIP ACCOMPLISHED?

In 1997, all six U.S. manufacturers of highway-class pavers signed a Voluntary Agreement with the Occupational Safety and Health Administration (OSHA), the Federal Highway Administration (FHWA), the National Asphalt Paving Association (NAPA), and labor groups agreeing to equip their machines with engineering controls that capture at least 80% of asphalt fumes generated during paving. By the mid-2000s, all such pavers in the United States included the controls. Follow-up field testing conducted by the partnership indicated that the engineering controls were effective at keeping worker exposure to asphalt fumes below levels recommended by the American Conference of Governmental Industrial Hygienists (ACGIH).

The partnership took protection from fumes a step further through a follow-up effort to develop, test and disseminate warm-mix asphalt, an achievement which collaborators describe as "the ultimate success story of the partnership."

BOX 1. ORGANIZATIONS INVOLVED:

Industry

- National Asphalt Pavement Association (NAPA)
- Association of Equipment Manufacturers (AEM)

Labor

- International Union of Operating Engineers (IUOE)
- Laborers' International Union of North America (LIUNA)
- Laborer's Health and Safety Fund of North America *(joint labor-management)*

Government

- The National Institute for Occupational Safety and Health (NIOSH)
- Occupational Safety and Health Administration (OSHA)
- Federal Highway Administration (FHWA)

Warm-mix asphalt (as compared to traditional "hot mix" asphalt) can be laid at lower temperatures so that it emits fewer fumes, decreasing worker exposure by at least 30-50%. With considerable economic and environmental benefits as well, warm-mix is now expected to largely replace hot-mix pavement in the coming years. In addition to the warm-mix initiative, the original partnership spun off additional collaborations and projects *(Box 2)*.

ABOUT THE PARTNERSHIP

HOW IT STARTED

The Asphalt Partnership began in the early 1990s, at a time of heightened awareness about toxic hazards in occupational health. Concerns about the effects of asphalt fumes were gaining momentum, in particular, their potential to cause cancer among asphalt paving workers. NIOSH had been conducting research on asphalt fumes and OSHA was also exploring their inclusion in an update to permissible exposure limits in construction. Labor groups shared these concerns, and the Laborer's Health and Safety Fund issued a report on the health effects of asphalt fumes. Additionally, Congress had recently passed legislation with a requirement to add crumb rubber from scrap tires to asphalt paving mix, and the FHWA was tasked with investigating the potential health effects.

From the National Asphalt Paving Association (NAPA) and the industry perspective, a possible classification of asphalt fumes as an occupational carcinogen was a serious threat. In addition to adverse health consequences for workers, the carcinogen label carried potential implications for regulation, legal liability, and public perception. At the same time, NAPA disagreed with conclusions drawn from existing research linking asphalt fumes to cancer and initially responded to government and labor concerns by contesting the science.

Even as industry was investing substantial sums in research to counter government evidence, a breakthrough occurred within NAPA. The chairperson, a prominent paving contractor, emerged as a champion for a new approach. He recalled thinking, "we're crazy to fight this. Why don't we just get away from exposing our people to these fumes, and then the issue goes away whether they're bad or good." The contractor leveraged his relationships to convince a core group of contractors and manufacturers to investigate the possibility of reducing worker exposures. Manufacturers developed prototype control packages, and initial tests suggested that fairly simple ventilation systems could significantly reduce the level of fumes near workers.

With promising preliminary tests of engineering controls, NAPA began reaching out to other stakeholder groups *(see Box 1)*. They knew that they needed the collaboration of key government agencies and labor unions in order to move forward with developing, testing, and implementing the controls. Challenges to collaboration were substantial, with stakeholders from all sides – labor, government, and industry – wary of participation. Leadership at NAPA embarked on efforts to establish trust and facilitate relationships within the fledgling partnership, a strategy which helped to overcome partners' concerns and pave the way for future success.

BOX 2. ADDITIONAL COLLABORATIONS & PROJECTS:

Silica/Milling: Testing & development of engineering controls to suppress silica dust on asphalt milling machines.

Work-zone safety: Trainings & development of information materials to improve roadway work-zone safety.

Dermal exposures: Research to assess & characterize workers' dermal exposures to asphalt in the paving industry.

ABOUT THE PARTNERSHIP (continued)

ROLES

All partners served unique and essential roles. NAPA provided overall leadership in initiating, administering, and facilitating the partnership. They actively invested in the functioning of the group, retaining a veteran labor lawyer with years of experience at high levels of government as the official facilitator and contributing funding for research. NAPA's member contractors, engineers, and other professionals also provided practical paving expertise. Labor contributed technical expertise on health and safety issues, critical worker protection perspectives, and also provided the leadership in convening a subsequent Work-Zone Safety Partnership. Designing, developing, and testing controls for their machines were the equipment manufacturers who committed to implementation of the changes through the voluntary agreement and invested substantial resources in the process. On the government end, NIOSH brought scientific research and evaluation expertise and helped shepherd the partnership's work through the agency's practice guidelines and hazard review processes. OSHA drafted the voluntary agreement, used their influence to bring partners together to sign it, and provided the critical legal cover against anti-trust concerns that made it possible for all the manufacturers to be involved. Finally, the FHWA provided essential resources for the group's early work and convened partners for crumb rubber health effects research, which helped lay the foundation for the engineering controls collaboration.

RESEARCH AND PRACTICE

High-quality research was incorporated throughout the partnership's work. As they developed and implemented interventions, they rigorously tested and evaluated their efforts to ensure effectiveness while continuing to support research on health hazards. Additionally, a "practice to research" orientation, in which industry needs inform scientific studies, allowed the partnership to overcome typical stumbling blocks involved in translating health and safety research into workable solutions. Integrating the strengths, resources, expertise, and concerns of all partners has yielded stronger, more relevant, and more useful research. For example, in developing engineering controls to reduce exposure to fumes, NIOSH provided expertise in the development and testing of control measures. Contractors, manufacturers and labor, on the other hand, had intimate knowledge of the paving process and equipment. Each partner was able to build upon the assets of the other and provide critical insights into creating an effective control that worked in the real world.

Above: Warm-Mix Asphalt (Photo: NAPA)

"You want to talk about r2p, you cannot have a better example… All of the pieces were linked."

- Bill Kajola, formerly of the Laborers' Health and Safety Fund of North America

CHALLENGES & OPPORTUNITIES

CHALLENGES

The Asphalt Paving Partnership faced significant challenges in establishing the group and working together. Foremost among these was getting a diverse group of people, who all entered the partnership with some level of reservations, "to talk on the same page." Labor and government representatives were initially wary of partnering with industry around the controversial worker health issue, but ultimately agreed that taking action to reduce exposures would be a positive step, regardless of previous differences. On the industry side, there was also distrust of both labor and government among members of NAPA's union and non-union contractors, and equipment manufacturers were far more accustomed to competing with each other than cooperating.

Other challenges included decisions about the type of solutions to pursue. Use of personal protective equipment was ruled out, with labor and contractors strongly objecting to putting workers in "moonsuits." Several concerns also emerged on the manufacturing side related to adaptation of controls to variations in machinery, perceptions of collusion and anti-trust activity in collaborating on technological innovation, and neutralizing threats that any one manufacturer might develop competitive advantage over another with the engineering controls.

OPPORTUNITIES

At the same time, opportunities also existed that influenced the formation of the partnership. The imminent threat of the classification of asphalt fumes as a carcinogen and recent memories of construction's experience with asbestos created a sense of urgency on the part of industry to focus attention on the worker health issue. Having a small, clearly defined universe of six manufacturers of large pavers to work with was advantageous in coordinating universal adoption of the controls, and even the nature of asphalt paving fumes and overlap with broader environmental concerns played a role. The high visibility and strong odor of asphalt fumes during paving operations and during production brought additional attention and pressure from members of the public and the environmental movement to understand and address any potential hazards.

Above: Work-Zone Safety (Photo: NAPA)

Recognizing that to successfully address challenges and take advantage of opportunities would require the buy-in and participation of all key stakeholders, the partnership invested substantial time and resources in developing positive group dynamics, or as one partner described it, "a healthy oxygen" in which the group could function. They ultimately developed a collaborative process that allowed them to achieve their goal of reducing worker exposure to asphalt fumes, while also creating the precedents, infrastructure, and momentum for proactively pursuing future health and safety improvements.

"[T]he important thing is that you've got to really work on what I call the chemistry of these relationships to make sure that there are sufficiently joint interests in making something work."

– Don Elisburg, facilitator

WHAT MAKES THE PARTNERSHIP WORK?

Asphalt partners described many ingredients for success and have themselves distilled a list of partnership principles that include: 1) protecting the health and safety of workers and the environment, 2) involvement of all key stakeholders, 3) openness, transparency, and trust, 4) practical research and technology, and 5) best practices implementation. These and other lessons learned from this partnership are described below.

- Identify a common vision and compartmentalize – A common mission allows the different partners to identify and work towards "win-win" solutions. Part of establishing this common vision involves identifying areas of disagreement outside the collaboration and a commitment to compartmentalize them from the work of the partnership.
- Identify concrete goals - In addition to a common mission, the partnership needs to establish a clear pathway for how they will work toward goals that are concrete and achievable.
- Involve all key stakeholders – Having critical stakeholders at the table helps to create buy-in for the effort from the beginning. It also allows the partnership to benefit from each partner's unique resources and expertise. Including relevant stakeholders also means making efforts to ensure that all partners feel respected, valued, committed, and have a voice.
- Champions, facilitators, and other leaders can help overcome resistance and concerns – If stakeholders are concerned about going in a new direction, strong champions of an effort can leverage relationships and create openings to try out a new approach. Bringing in trusted facilitators to bridge groups that do not already have strong, established relationships can help address concerns and smooth the process.
- Prioritize relationships – Positive group dynamics are vital to success, and partnerships can actively invest in the quality of the group's relationships. These include establishing trust and transparency and encouraging inclusiveness. These activities can be time and resource intensive, but establishing positive relationships early on is critical.
- Maximize the benefits of partnership – Conducting joint research provides significant benefits, and a partnership allows stakeholders to overcome typical gaps in translating research to practice. Real-world concerns and circumstances can be incorporated into solutions, and involving all key stakeholders increases the possibility of achieving widespread adoption.
- Adopt a precautionary approach – Traditional adversarial approaches that focus primarily on contesting the health effects research of occupational exposures can be costly and protracted. A precautionary approach that aims to remove or reduce the hazard even before conclusive evidence on health effects is established can be more efficient, productive, and rewarding.
- Nothing succeeds like success – Partnerships can act as an impetus for subsequent worker health and safety efforts. They can help establish new norms and group identities and build the collaborative infrastructure to sustain the group's momentum to promote worker health and safety.

For more information on this and other successful r2p partnerships, please visit us at www.cpwr.com