WORK ZONE DATA EXCHANGE

Worker Presence Interview Lessons

August 2022

The WZDx Worker Presence Subgroup co-chairs conducted a series of interviews with 13 organizations to gain a deeper understanding of their desires, goals, concerns, and obstacles concerning the use of real-time WZDx and worker presence data within their organizational contexts. Their answers reveal the importance of work zone information, use cases for worker presence data, and the benefits of producers providing work zone and worker presence data even if it is not perfect.

About the Interviewees

Interviews were conducted between September 2021 and May 2022. The co-chairs engaged a variety of stakeholders with different perspectives and organizational missions. The interviewees fell into 2 broad categories: Data Producers and Data Consumers.

Data Producers mostly comprised makers of advanced traffic management systems (ATMS) software, and included GEWI, Q-Free, SwRI, and Panasonic. Data Consumers included mapping companies, developers of automated driving systems (ADS), and navigation and traveler information providers. Participants included GM, Kodiak, Locomation, Ford, and Argo AI. In addition, the Laborer's Fund, which doesn't neatly fit into either category, gave an interview, adding their perspective as work zone workers.

What is worker presence information?

Information about workers who are in a work zone, including the geographic coordinates of the work area, where workers are relative to the flow of traffic, and what method is used to confirm their presence.

How does WZDx help keep workers safe?

WZDx is a common specification for sharing information about work zones. When broadly adopted, it will deliver real-time work zone information to drivers and automated driving systems, which could help increase driver awareness and improve automated driving.

Survey Findings

Nearly all of the interviewees expressed interest in work zone and worker presence data, and most confirmed that it would add value to help advance their organization's missions. Information about the work zone itself, including location (roadway, start and end point, and direction of travel affected) and time (start and end time) were seen as higher priority than real-time worker presence information, but all elements are considered of potential value to data consumers.

Highly detailed worker presence information isn't necessary, but indications of when data was most recently confirmed are important. Most interviewees indicated that simply having information that workers were present somewhere within the work zone would be adequate. However, a few said that geolocation information for each human would be of value. Many stated that having timestamps indicating the "freshness" of data would be crucial. It has been suggested that worker presence information could serve as a proxy for an active work zone.

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For more information visit: https://github.com/usdot-jpo-ode/wzdx

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There are several different use cases for worker presence information across different stakeholder types. ADS developers expressed interest in using worker presence data to advance Driver Assist capabilities. Similarly, mapping companies believed worker presence data could enrich routing and navigation functions. ATMS software vendors in the Data Producer group saw worker presence as a tool for identifying active work zones, including automating tasks such as Dynamic Message Sign (DMS) messages and speed limit reductions using Variable Speed Limit (VSL) signs.

A standard definition of worker presence isn't necessary for most stakeholders. When asked whether a standard definition would help advance worker presence data integrations, most said no. However, one interviewee stated that, if a driver observed humans anywhere within the work zone while passing through it, it should count as workers being present. For example, if a system generated a "workers ahead" alert, the driver would expect to see human beings working somewhere in the work zone, regardless of whether they were on the road, in a vehicle, taking a break away from the road, or another work-related activity.

Limiting false positive reports of workers in work zones is important for drivers. Both ADS developers and mapping companies expressed concerns over incorrect information being passed along to drivers, resulting in alert fatigue and loss of trust in their systems. One indicated they might be penalized by OEM partners for disseminating incorrect or imprecise information about work zones to drivers. Like Data Consumers, ATMS developers were concerned about providing trustworthy and reliable information to drivers through message signs or roadside units. In general, false positives were viewed as more concerning than false negatives. A false positive–and a false alarm that work zones or human workers are ahead–may be more likely to result in an end user's loss of trust than the lack of an alarm about a work zone that actually encountered.

Data Consumers won't rely only on WZDx or worker presence information, so perfect accuracy or timeliness isn't necessary. Many Data Consumers stated they would not use WZDx data alone as the sole source of truth about work zones or the presence of workers within them. Supplemental, corroborating evidence about the presence of the work zone and workers would be necessary from vehicle sensors or cameras and other real-time sources.

Most data consumers stated that some data or imperfect data is better than no data when it comes to work zone information. While it would be ideal if data were perfect, most expressed some tolerance for data irregularities or errors. One company explained that if they had a clear understanding of the specific ways in which the data are likely to be wrong, it would help build fault tolerance in their systems. Having advance knowledge of the "edge cases" could also reduce the risk of integrating with imperfect data.

For most data consumers, information needs to arrive within minutes - a range of 2-15 minutes was identified across all interviewees who had a quantitative answer.

Key Takeaways

Accuracy is important, but perfection is not needed

Timeliness on the order of minutes

Accuracy issues are more manageable if failure modes are known in advance

Limited concern around worker presence definition. Will drivers "know it when they see it"?