State of California
Department of Industrial Relations
Division of Occupational Safety and Health
Memorandum

Date: August 30, 2024

To: Joseph Alioto, Board Chair
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Occupational Safety and Health Standards Board

From: Debra Lee, Chief
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Division of Occupational Safety and Health (Cal/OSHA)

Subject: Request for an advisory committee to discuss possible regulation of autonomous vehicles in agriculture

1.0 INTRODUCTION

Petitions 571 (November 26, 2018) and 596 (Dec. 20, 2021) requested title 8 be amended to permit the use of autonomous agricultural vehicles. Cal/OSHA recommended denial of the petitions because the technology was not yet proven safe around workers.

Since the denial of the of the petitions, Cal/OSHA through review of manufacturers' literature, discussions with manufacturers, experts and academia, and observing the vehicles operate during site visits and tests, has learned much about the autonomous vehicle technology.

Based on the new knowledge, Cal/OSHA rescinds its opposition to the use of autonomous vehicles in agriculture. Cal/OSHA supports the use of certain autonomous vehicles that are unlikely to cause injury or harm. Cal/OSHA recommends that a balanced advisory committee be convened to further discuss possible regulations for certain autonomous vehicles in agriculture.

2.0 BACKGROUND

2.1 Title 8 does not currently allow the use of autonomous tractors

Title 8 section 3441 Operation of Agricultural Equipment contains the requirements for agricultural vehicles.

Subsection 3441(b) requires that all self-propelled equipment have an operator stationed at the vehicular controls. An exception to this requirement is in subsection 3441(b)(1), which permits certain furrow guided vehicles that travel less than two miles per hour to have an operator not on the equipment. However, an operator is still required and must have access to vehicle controls and a good view of the course of travel of the equipment and any employees in the immediate vicinity.

Both subsections 3441(b) and 3441(b)(1) require an operator for self-powered agricultural equipment. Thus, these subsections do not permit the use of an autonomous vehicle controlled solely by artificial intelligence or other type of computer control.

2.2 Not all autonomous agricultural vehicle use is prohibited

If there are no employees at a worksite and no employee access to a worksite, autonomous agricultural vehicles usage at that site does not constitute a violation of title 8 per decisions from the Occupational Safety and Health Appeals Board (OSHAB).

Per case law from the OSHAB, Cal/OSHA must prove employee exposure to a hazard for it to be able to cite an employer. According to the OSHAB, employee exposure exists where employees can access the zone of danger or area of the hazard while in the course of their assigned work duties, pursuing personal activities during or at work, and normal means of ingress and egress at work. The area of the hazard is accessible to employees if it is reasonably predictable by operational necessity or otherwise, including inadvertence, that employees have been, are, or will be in the zone of danger. The zone of danger is that area surrounding a violative condition that presents the danger to employees that the regulation is intended to prevent.

For further details regarding employee exposure, please see the following Decisions after Reconsideration from the OSHAB:

- Dynamic Construction Services, Inc. (Dec. 1, 2016)
- Ja-Con Construction Systems, Inc. (Mar. 27, 2006)
- Benicia Foundry & Iron Works (April 24, 2003)

2.3 Experimental Variance with Monarch Tractor

On August 6, 2021, Cal/OSHA granted an experimental variance to Monarch Tractor to operate autonomous tractors in two fields for a period of five years, The experimental variance contained numerous conditions for required safety protocols and reporting including requiring an operator at the controls in the initial stages of the experimental variance.

On January 28, 2022, Operating Engineers Local 3 (OE3), filed an appeal of the experimental variance with the Occupational Safety and Health Standards Board (Standards Board) and requested the experimental variance be vacated. OE3 alleged that its union members are adversely affected by the experimental variance. On December 21, 2023, Cal/OSHA, OE3, and

Monarch reached a settlement agreement prior to an appeal hearing. The agreement partially consists of the following:

1. OE3 withdrew its appeal
2. Cal/OSHA will provide OE3 with periodic updates on the progress of the experimental variance in January, April, July and October of each calendar year in which the experimental variance is in effect.
3. Cal/OSHA will provide OE3 notice of potential changes to the terms of the experimental variance and allow OE3 30 days to comment and provide input about any changes to the experimental variance, as well as to provide recommendations regarding questions and information for Cal/OSHA representative to ask and collect from workers and the employer as part of Cal/OSHA's evaluation of the experimental variance.
4. OE3 may ask Cal/OSHA questions about the TEV and Cal/OSHA will provide timely responses and may include information from Monarch.

The experimental variance has not produced data to evaluate autonomous tractor safety around workers as anticipated because there have been no workers in the fields where the Monarch tractors operate. Cal/OSHA has permitted the experimental variance to continue as it is still able to gather data and knowledge on the operation of the tractors.

3.0 Future Advisory Committee Recommendation.

Cal/OSHA believes that lightweight, low power, and slow autonomous vehicles (under 500 lbs., less than 20 horsepower total, and a maximum speed under two miles per hour (normal walking speed and consistent with subsection 3441(b)(1)) would be appropriate to consider for an advisory meetings and possible future rulemaking.

Autonomous vehicles in this class are already available on the market and are designed to work collaboratively with and in close proximity to workers. Several anti-collision safety features would be necessary, which at a minimum would include:

- Vehicle control by a computer with a deep learning neural network,
- Three-dimensional cameras all around the vehicle to detect persons and objects to slow and stop the vehicle to prevent collisions.
- Energy absorbing bumpers around the vehicle that will automatically and immediately stop the vehicle on contact in case other safety systems do not operate properly or fail. The bumpers would function independently of any other technology or safety system.

Use of lightweight, low power, and slow vehicles initially is the best way to collect data on how the autonomous and anti-collision technology works in practice around persons. Since they work closely with people, there would be ample data to collect on person-vehicle interactions. Part of any proposal would be a requirement for the vehicles to record and store detailed data (video, audio, computer control commands, etc.) before and after near misses and contacts. The data would be uploaded to a central database that could be analyzed and studied.

Lightweight, low power, and slow vehicles are ideal for initial usage of autonomous technology because in the event that such a vehicle contacts a person, an injury is unlikely. Whereas a larger tractor would be much more likely to cause injury. Once sufficient data is collected and studied, a determination can be made about expanding the use of autonomous technology to larger vehicles.

4.0 MAKE-UP OF AN ADVISORY COMMITTEE

To ensure the credibility of the advisory committee, it is important that it be well balanced and not dominated by any one perspective on autonomous vehicles.

The advisory committee should consist of: manufacturers of autonomous vehicles, agricultural employers, labor organizations, labor advocates, agricultural workers, academia and researchers with expertise in agriculture and occupational safety, and applicable governmental agencies.