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September 30, 2026

Liz Ortega
Assemblymember, 20th District
22320 Foothill Blvd., Suite 540
Hayward, CA 94541

Dear Assemblymember Ortega:

Please see the attached memo in response to your inquiry regarding cumulative trauma injuries and automation in California warehouses. If you or your staff have any questions, please do not hesitate to reach out.

Sincerely,

A handwritten signature in black ink, appearing to read "Saba Waheed", with a stylized flourish at the end.

Saba Waheed
Director
UCLA Labor Center
675 S Park View Street
Los Angeles, CA 90057

MEMORANDUM

TO: Liz Ortega, *Assemblymember, 20th District*

FROM: Brian Justie and Saba Waheed, *UCLA Labor Center*

RE: "Amazon Warehouses, AI, and Cumulative Trauma (CT) Injuries"

DATE: September 30, 2026

The Rise and Reality of Cumulative Trauma

For more than three decades, workplace injuries occurring gradually over time—as opposed to acute, or specific, impact incidents—have been the focus of considerable and often contentious attention from employers, insurance carriers, regulators, and ergonomics advocates. These injuries are variably referred to by several related terms including repeated-stress, repetitive motion, musculoskeletal disorders (MSD), and cumulative trauma disorders (CT or CTD). This category includes injuries that develop from repeated physical movements performed over days, months, or years on the job, including carpal tunnel syndrome, bursitis, tendinitis, joint or ligament degeneration, and chronic pain in the back, shoulder, hips, or other load-bearing areas.

Given the nature of these "wear-and-tear" injuries, which cannot be attributed to isolated workplace events, there is a fundamental ambiguity to their diagnosis. As such, workers and medical evaluators must typically present significant evidence that the injury was caused by occupational factors in order to qualify for workers' compensation, while employers and insurance carriers often dispute these claims on grounds that injury cannot be strictly associated with working conditions alone.¹

Despite these challenges, cumulative trauma and similar injuries have constituted the majority of all workplace injuries for at least three decades, and some sources indicate that the number of cases is steadily growing.² Advocates campaigning for reform of workers' compensation—especially employer groups and insurance carriers—have periodically sounded the alarm that cumulative trauma injuries in particular are creating unsustainable strain on the state's benefits system and harming employers.³ A new campaign recently launched in California that once again takes aim at workers' compensation claims involving CT injuries.⁴

Historical Context

The significance of this contemporary trend, however, can be better understood by taking stock of the history of workplace safety and the changing landscape of work in California. Research has shown that CT and similar injuries are not random or inevitable, but rather are associated

with particular working conditions, workplace technologies, and worker demographics, while tending to be concentrated in specific sectors.

Taking a broad historical perspective, medical historian Allard E. Dembe has argued that "the history of occupational [cumulative trauma disorders] suggests that outbreaks typically occur in response to the introduction of new technologies and/or systems of work organization."⁵ Dembe further argues that CT injuries are especially likely to emerge in periods of economic turbulence and job loss, and are historically most prevalent among vulnerable workers, including immigrants and women. These harms, according to Dembe, are driven primarily by employers demanding increased output from individual workers leading to greater strain and risk of injury, and in turn a higher likelihood that workers pursue medical accommodations in response.⁶

These factors first converged in the 1980s with the arrival of new high-speed automation technologies in the meatpacking and automobile manufacturing industries, both of which saw a subsequent surge in CTDs. Bureau of Labor Statistics (BLS) data shows a roughly tenfold increase in CTDs over that decade, with the proportion of "repeated-trauma injuries" more than doubling between 1986 and 1996, rising to account for nearly two-thirds of all occupational injuries.⁷ In response, unions like United Automobile Workers (UAW), United Food and Commercial Workers (UFCW), and the International Association of Machinists and Aerospace Workers (IAM) campaigned to raise awareness of the issue, and eventually bargained to win concessions from employers around ergonomics improvements, while also catalyzing more robust regulatory action by state and federal occupational safety agencies.⁸

Safety Risks in Warehousing & Logistics

Today, the logistics sector—and warehousing in particular—has become the new flashpoint in workplace safety, presenting challenges for regulators and legislators around the growing prevalence of cumulative trauma injuries. Studies and investigations conducted by academics, governmental organizations, and journalists have reached the same conclusion: the modern warehouse is a very dangerous place to work, and the regime of automation and surveillance pioneered by Amazon poses unprecedented risks to workers. The following findings provide context and data that make this case clear:

- Warehousing and transportation workers experience the highest rate of occupational injury, and the vast majority of injuries recorded by BLS are MSDs.⁹
- Workers in Amazon warehouses experienced more than 30% more injuries than the industry average in 2023; and in 2024, the serious injury rate in Amazon warehouses was double that of its competitors.¹⁰
- Internal Amazon data shows that MSDs make up a growing share of total injuries, from 45% in 2021 to 57% in 2023.¹¹
- A major OSHA investigation found that Amazon failed to keep warehouse workers safe, exposing them to disproportionately high rates of MSDs.¹²
- Amazon warehouse workers have reported that intensive surveillance on the job leads them to work faster than they feel is safe.¹³

Over the last fifteen years, Amazon has completely transformed their warehouses into heavily automated and roboticized environments¹⁴:

2012	Amazon acquires Kiva Systems for \$775m and introduces Hercules robots to its warehouses which move stacks of inventory known as "pods"
2014	Amazon's Robo-Stow system begins to automate pallet transport, replacing conventional fork lifts driven by human workers
2019	Amazon introduces Pegasus and Xanthus , updated versions of the Hercules for moving inventory autonomously
2022	Amazon introduces Proteus , the first AI-powered robot that moves through the warehouse amongst human workers
2023	Amazon begins piloting Sequoia , which locates, sorts, and transports inventory directly to human workers, touting major ergonomics improvements
2025	Amazon currently has more than a million robots in its warehouses, with plans to replace more than 500,000 workers in the coming years ¹⁵

Many studies have drawn a direct connection between Amazon's uniquely aggressive approach to automation and surveillance and the widely documented unsafe work environment in its warehouses.¹⁶ Researchers have also made the case that some forms of warehouse automation and robotics may indeed reduce the risk of severe acute injuries, while simultaneously raising general worker exposure to CT and similar injuries by standardizing rote bodily movements and intensifying physical labor.¹⁷

However, public data on workplace injuries published by BLS calls into question a key pillar of Amazon's messaging around workplace safety. In response to reports of high injury rates in Amazon warehouses, the company has repeatedly cited automation and AI as driving a revolution in workplace safety by reducing worker exposure to injury risk.¹⁸ Yet even as automation and AI have been further integrated into warehouses, the nonfatal injury incidence rate for Warehousing and Storage (NAICS 493) in California has remained unchanged since 2017, with the total number of injuries (+92.75%) increasing largely in proportion to the growth in total employment (+86.50%). This stagnant incidence rate—which is more than double the rate for all private industry—suggests that more technology is not necessarily leading to safer working conditions in warehouses, in spite of the corporate narrative.

<i>Incidence rates and numbers of nonfatal occupational injuries in California¹⁹</i>			
Warehousing and Storage (NAICS 493)			
Year	Incidence Rate	Total Injuries	Total Employment
2017	6%	6,900	131,100
2018	6.2%	8,200	148,200
2019	6.2%	8,200	165,800
2020	3.9%	6,000	196,000
2021	5.8%	11,300	228,200
2022	6%	12,700	254,700
2023	6.1%	13,600	244,100
2024	6%	13,300	244,500

California Labor Market Trends

As the incidence rate remains steady, the significant growth in total injuries—and presumable increase in corresponding workers' compensation claims—reflects the changing nature of California's labor market. According to BLS analysis of workplace injuries, the sectors with the highest incidence rates for cumulative injuries are also the sectors that are growing most rapidly in California.²⁰

Transportation and Warehousing has by far the highest incidence rate of cumulative injury while having grown in total employment since 2011 by 84% (while the Warehousing and Storage subsector has grown by nearly 250%), followed by a high incidence rate in Healthcare and Social Assistance, which has grown by more than 55% in total employment. These employment figures—both of which far outpace overall state employment growth—indicate that the share of Californian workers in high-risk jobs is dramatically increasing, leading to a corresponding increase in the number of injuries and workers' compensation claims. This trend will likely continue: Over the next decade, Healthcare and Social Assistance is slated to grow by more than 26%, and Transportation and Warehousing by nearly 20%.²¹

A number of other structural factors further complicate the story of runaway workers' compensation claims involving CT injuries. Both warehousing and healthcare demonstrate an above-average rate of employee turnover or nonstandard hiring arrangements, significantly raising the possibility of legitimate "post-termination" filings for workers' compensation—a key piece of existing workers' compensation policy that has been targeted by advocates for reform.²²

Given the nature of cumulative trauma disorders, which emerge over time, this factor is essential for understanding how overall employment trends might affect the type and timing of workers' compensation claims. Amazon warehouses in California, for example, have been

shown to operate with an unprecedented rate of turnover, upwards of 100% per year.²³ And research into the healthcare professions has shown that it is one of the sectors transitioning most rapidly to nonstandard work arrangements.²⁴ Finally, California's workforce is aging, with the share of workers aged 55 and older growing by more than 50% over the last two decades.²⁵ This trend represents an ongoing structural shift that, based on analysis by BLS and OSHA which shows older workers are at a higher risk, will mean more total cumulative injury claims.²⁶

Protect the Protections

Amidst ongoing calls to reform the workers' compensation system by limiting coverage of CT and related injuries, it is critical to remember that rising claims numbers mean more workers are suffering. That a growing number of workers are employed in sectors with high injury risk is a simple reflection of how the state's economy is evolving—a fact that should be met with more robust protections. A recent Department of Labor study found that OSHA currently lacks the inspection capacity to account for the unprecedented growth in warehousing employment, despite mounting evidence that workers in the sector are at extremely high risk.²⁷ California's legislators should respond not by winnowing workplace safety rights for workers, but rather by increasing oversight capacity in key sectors to ensure the state's most vulnerable workers are not falling through the cracks.

California has been a national leader on this issue, and labor has been in the fight since the beginning. As the first state to codify a distinction between "specific" and "cumulative" injuries in 1968, California broke new ground on worker protections that provided a blueprint for legislators and organizers across the country. In the 1990s, California became the first state with an enforceable ergonomics framework specifically geared to address the growing number of CT injuries, but only after the state's Labor Federation sued the regulatory board to force action. Such efforts continue to this day, as organizations like the Warehouse Worker Resource Center provide legal aid and conduct "know your rights" training for workers, ensuring that workers are more likely to file a successful claim following cumulative workplace injury. As the workers' compensation system is once again subjected to scrutiny from employer groups and insurance carriers, it is paramount that worker protections remain robust and accessible to reflect the ways that working conditions and the labor market writ large are changing in California.

¹ Barbara S. Webster and Stover H. Snook, "The Cost of Compensable Upper Extremity Cumulative Trauma Disorders," *Journal of Occupational Medicine* 36, no. 7 (July 1994): 713–17; Michael B. Lax, "Occupational Disease: Addressing the Problem of Under-Diagnosis," *New Solutions* 6, no. 4 (Summer 1996): 81–92; Tim F. Morse et al., "The Economic and Social Consequences of Work-Related Musculoskeletal Disorders: The Connecticut Upper-Extremity Surveillance Project (CUSP)," *International Journal of Occupational and Environmental Health* 4, no. 4 (October/December 1998): 209–16; Allard E. Dembe, "Access to Medical Care for Occupational Disorders: Difficulties and Disparities," *Journal of Health & Social Policy* 12, no. 4 (2001): 19–33; Leslie I. Boden and Monica Galizzi, "Economic Consequences of Workplace Illnesses and Injuries: Lost Earnings and Compensation," *American Journal of Industrial Medicine* 44, no. 3 (September 2003): 237–49, <https://doi.org/10.1002/ajim.10213>.

² National Institute for Occupational Safety and Health, *Cumulative Trauma Disorders in the Workplace: Bibliography*, DHHS (NIOSH) Publication No. 95-119 (Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, September 1995), https://stacks.cdc.gov/view/cdc/11215/cdc_11215_DS1.pdf; U.S. Bureau of Labor Statistics, "Most Reported Occupational Illnesses Are Repeated-Trauma Disorders," *The Economics Daily*, August 13, 1999, <https://www.bls.gov/opub/ted/1999/Aug/wk2/art05.htm>; David Fairris and Mark Brenner, "Workplace Transformation

and the Rise in Cumulative Trauma Disorders: Is There a Connection?" (working paper, eScholarship, University of California, March 1, 2001), <https://escholarship.org/content/qt394643qt/qt394643qt.pdf>; U.S. Bureau of Labor Statistics, "25 Years of Worker Injury, Illness, and Fatality Case Data," *Spotlight on Statistics*, March 2019, slide 14, <https://www.bls.gov/spotlight/2019/25-years-of-worker-injury-illness-and-fatality-case-data/home.htm>; California Workers' Compensation Institute, *Cumulative Trauma Claims in California Workers' Compensation: A Report to the Industry* (Oakland, CA: CWCI, August 2026), https://www.cwci.org/wp-content/uploads/2026/08/CT-Study_CWCI-RptToTheIndustry_Aug2026.pdf.

³ California Department of Industrial Relations, *Meaningful Reform of Workers' Compensation in California* (San Francisco: California Department of Industrial Relations, June 15, 1995), https://www.dir.ca.gov/od_pub/wc_ref/Meaningful_Reform.html; "California Workers' Comp Reform Passes," *NBC News*, April 16, 2004, <https://www.nbcnews.com/id/wbna4759480>.

⁴ "Campaign Launches to Fix Workers' Comp System," *CalChamber Alert*, May 22, 2026, <https://calchamberalert.com/2026/05/22/campaign-launches-to-fix-workers-comp-system/>.

⁵ Allard E. Dembe, *Occupation and Disease: How Social Factors Affect the Conception of Work-Related Disorders* (New Haven, CT: Yale University Press, 1996), 94.

⁶ *Ibid.*, 95.

⁷ Theresa A. Cortese, "Cumulative Trauma Disorders: A Hidden Downside to Technological Advancement," *Journal of Contemporary Health Law and Policy* 11, no. 2 (1995): 479–502, <https://scholarship.law.edu/cgi/viewcontent.cgi?article=1416&context=jchlp>; U.S. Bureau of Labor Statistics, "Most Reported Occupational Illnesses Are Repeated-Trauma Disorders," *The Economics Daily*, August 13, 1999, <https://www.bls.gov/opub/ted/1999/Aug/wk2/art05.htm>.

⁸ Dembe, *Occupation and Disease*, 237.

⁹ U.S. Government Accountability Office, *Workplace Safety and Health: OSHA Should Take Steps to Better Identify and Address Ergonomic Hazards at Warehouses and Delivery Companies*, GAO-24-106413 (Washington, DC: GAO, September 2024), <https://www.gao.gov/assets/gao-24-106413.pdf>.

¹⁰ U.S. Senate Committee on Health, Education, Labor, and Pensions, *"The Injury-Productivity Trade-off": How Amazon's Obsession With Speed Creates Uniquely Dangerous Warehouses*, (Washington, DC: U.S. Senate, July 2024), https://www.help.senate.gov/imo/media/doc/amazon_investigation.pdf; Strategic Organizing Center, *Failure to Deliver: Amazon Falls Short on Safety* (Washington, DC: Strategic Organizing Center, May 2025), https://thesoc.org/wp-content/uploads/2025/05/May-2025_Strategic-Organizing-Center_Report-x-Failure-To-Deliver.pdf.

¹¹ Senate Committee on Health, Education, Labor, and Pensions, *"The Injury-Productivity Trade-off,"* 50.

¹² U.S. Department of Labor, "US Department of Labor Finds Amazon Exposed Workers to Unsafe Conditions, Ergonomic Hazards at Three More Warehouses in Colorado, Idaho, New York," news release, February 1, 2023, <https://www.dol.gov/newsroom/releases/osha/osha20230201-0>.

¹³ Beth Gutelius and Sanjay Pinto, *Pain Points: Data on Work Intensity, Monitoring, and Health at Amazon Warehouses* (Chicago: Center for Urban Economic Development, University of Illinois Chicago, October 2023), https://indigo.uic.edu/articles/report/Pain_Points_Data_on_Work_Intensity_Monitoring_and_Health_at_Amazon_Warehouses/24435124.

¹⁴ Benjamin Y. Fong, "A Brief Primer on Amazon Robots," *On the Seams*, November 14, 2024, <https://ontheseams.substack.com/p/a-brief-primer-on-amazon-robots>.

¹⁵ Karen Weise, "Amazon Plans to Replace More Than Half a Million Jobs With Robots," *The New York Times*, October 21, 2025, <https://www.nytimes.com/2025/10/21/technology/inside-amazons-plans-to-replace-workers-with-robots.html>.

¹⁶ Beth Gutelius and Nik Theodore, *The Future of Warehouse Work: Technological Change in the U.S. Logistics Industry* (UC Berkeley Center for Labor Research and Education and Working Partnerships USA, October 22, 2019), <https://laborcenter.berkeley.edu/future-of-warehouse-work/>; Will Evans, "Behind the Smiles: Amazon's Internal Injury Records Expose the True Toll of Its Relentless Drive for Speed," *Reveal*, Center for Investigative Reporting, November 25, 2019, <https://revealnews.org/article/behind-the-smiles/>; Gutelius and Pinto, *Pain Points*; Senate Committee on Health, Education, Labor, and Pensions, *"The Injury-Productivity Trade-off."*

¹⁷ Hendrik Lager, Alfredo Virgillito, and Tom-Philipp Buchberger, "Digitalization of Logistics Work: Ergonomic Improvements Versus Work Intensification," in *Digital Supply Chains and the Human Factor: Integrating Technology and People*, ed. Hendrik Lager et al. (Berlin: Springer, 2021), 35–48, https://wp.kennisbanksocialeinnovatie.nl/wp-content/uploads/2021/10/Lager2021_Chapter_DigitalizationOfLogisticsWorkE.pdf; Gordon Burtch, Brad Greenwood, and Kiron Ravindran, "Lucy and the Chocolate Factory: Warehouse Robotics and Worker Safety," SSRN Working Paper No. 4389032, March 15, 2023, <https://ssrn.com/abstract=4389032>.

¹⁸ Amazon, "10 Years of Amazon Robotics: How Robots Help Sort Packages, Move Product, and Improve Safety," *About Amazon*, June 21, 2022, <https://www.aboutamazon.com/news/operations/10-years-of-amazon-robotics-how-robots-help-sort-packages-move-product-and-improve-safety>; Amazon, *Delivered with Care: Amazon's 2022 Safety*,

Health, and Well-Being Report (Seattle: Amazon.com, 2023), <https://web.archive.org/web/20240229170031/https://cdn-safety.aboutamazon.com/ea/c3/d72d03394d0db22e336048031ec8/amazon-safety-report-2022-v41.pdf>; Scott Dresser, "How Robotics Improve Safety in Amazon's Operations," *About Amazon*, November 30, 2023, <https://www.aboutamazon.com/news/operations/amazon-robotics-safety>.

¹⁹ California Department of Industrial Relations, Office of the Director – Research, *Survey of Occupational Injuries and Illnesses: Table 4 (Incidence Rates and Numbers of Nonfatal Occupational Injuries by Selected Industries, California)*, annual reports for 2017–2024, <https://www.dir.ca.gov/OPRL/nonfatal.htm>.

²⁰ U.S. Bureau of Labor Statistics, "Occupational Injuries and Illnesses Resulting in Musculoskeletal Disorders (MSDs)," Factsheet, Injuries, Illnesses, and Fatalities, accessed September 8, 2026, <https://www.bls.gov/iif/factsheets/msds.htm>.

²¹ California Employment Development Department, Labor Market Information Division, *2024–2034 Occupational Employment Projections* (dataset), accessed September 8, 2026, <https://labormarketinfo.edd.ca.gov/data/employment-projections.html>.

²² Workers' Compensation Insurance Rating Bureau of California, *Emerging Patterns of Cumulative Trauma Claims* (San Francisco: WCIRB California, June 10, 2026), https://www.wcirb.com/sites/default/files/2026-06/emerging_patterns_of_cumulative_trauma_claims-2026-06-10.pdf.

²³ Irene Tung and Deborah Berkowitz, *Amazon's Disposable Workers: High Injury and Turnover Rates at Fulfillment Centers in California*, Policy & Data Brief (New York: National Employment Law Project, March 6, 2020), <https://www.nelp.org/insights-research/amazons-disposable-workers-high-injury-turnover-rates-fulfillment-centers-california/>.

²⁴ Andrew D. Jopson and Bianca K. Frogner, *An Examination of Health Care Workers in Nonstandard Work Arrangements and Self-Employment* (Seattle: Center for Health Workforce Studies, University of Washington, November 2021), <https://familymedicine.uw.edu/chws/wp-content/uploads/sites/5/2021/11/An-Examination-of-Health-Care-Workers-in-Nonstandard-Work-Arrangements-and-Self-Employment.pdf>.

²⁵ Sean Cremin and Tess Thorman, *Who Are California's Workers?*, Fact Sheet (San Francisco: Public Policy Institute of California, February 2026), <https://www.ppic.org/publication/who-are-californias-workers/>.

²⁶ Occupational Safety and Health Administration, *Caring for Our Caregivers*, 9–10; U.S. Bureau of Labor Statistics, "Occupational Injuries and Illnesses Resulting in Musculoskeletal Disorders."

²⁷ U.S. Department of Labor, Office of Inspector General, Office of Audit, *COVID-19: OSHA Needs to Do More to Address High Injury Rates of Warehouse Workers*, Report No. 19-23-013-10-105 (Washington, DC: U.S. Department of Labor, September 27, 2023), <https://www.oig.dol.gov/public/reports/oa/2023/19-23-013-10-105.pdf>.