Robotic Collaboration: Humans + Machines Safely Working Together Stats and Facts

FACTS

- **Robots Do Not Always Know You Are There:** A machine that appears idle may be in a paused state — not a safe state — and can restart without warning. Proximity to a robot is never the same as being safe from it.
- **Maintenance Is the Highest-Risk Moment:** Most serious robot-related injuries occur during maintenance, repair, and programming — not during normal operation. Workers who enter a robot's work envelope to service equipment face the greatest exposure.
- **Collaborative Does Not Mean Risk-Free:** Cobots are designed to work alongside humans more safely than traditional robots, but they still carry force, speed, and pinch-point hazards. Proximity changes the risk — it does not eliminate it.
- **Unexpected Activation Is the Leading Cause of Injury:** Workers are most often harmed when a robot activates while they believe it is stopped. Lockout/tagout principles apply to robotic systems as directly as to any other powered equipment.
- **Boundary Zones Must Be Respected:** Safety zones around robotic systems are engineered controls, not suggestions. Entering a robot's work envelope without correct isolation is the equivalent of reaching into a running machine.

STATS

- There were 41 robot-related fatalities in the United States between 1992 and 2017, with 85 percent of victims being male and the highest concentration among workers aged 35 to 44,

according to a 2023 study in the American Journal of Industrial Medicine.

- An analysis of OSHA Severe Injury Reports from 2015 to 2022 identified 77 robot-related accidents across U.S. industries, with unexpected activation causing over 60 percent of incidents.
- The number of industrial robots in U.S. factories grew by 10 percent in 2022, and service robots sold for professional use rose to 158,000 units – a 48 percent increase – according to NIOSH.
- At Tesla's Giga Texas facility, an engineer was attacked by a robot that had not been properly shut down – pinned against a surface with its claws driven into his body before a coworker activated an emergency stop, according to an injury report revealed in December 2023.
- A woman at an Alabama automaker plant died after a robot abruptly restarted and pushed her into another machine. OSHA found 19 egregious willful violations by the employer.
- NIOSH has identified a significant knowledge gap in human-robot interaction safety data and is actively developing new surveillance methods as robotic deployment accelerates across U.S. industries.