Alpha Omega Engineering, Inc.

An engineering consultancy on the Central Coast of California

Man loses arm in baling machine

A worker suffered a catastrophic injury while operating a baling machine that was used to bale the black plastic sheeting used on strawberry fields. We were experts for the plaintiff. A full investigation was made of the machine–its design and operation. Applicable design and operation codes for the machine were investigated. Comparable injuries were investigated too, e.g. injuries involving conveyor belts. A number of flaws in the machine were found.

Plastic baler, showing location of injury and relative location of E-stop.

In investigating the manufacturer of the baling machine, it became evident that the level of engineering invested in its design was poor. Also, the machine was controlled by a programmable logic controller (PLC). There are various ways to integrate a PLC into a machine or system, and it was found that the PLC/machine integration in this case was non-optimal. In case of emergency, if the emergency stop button was pressed, the power to the machine was cut in a questionable manner, and it depended on the foolproof operation of the PLC's operating system. Also problematic was that the machine was designed and manufactured with no thought-out cataloging of failure scenarios. It is good and accepted engineering practice to identify possible failures and dangers and then to design them out of the machine. Guards and shields against moving parts and pinch points were poor and could be removed without disabling the machine. Last, emergency stops were not located at every pinch point. In this case, the worker said he saw the accident occurring in slow motion. Had there been an emergency stop right at the pinch point where his arm was drawn into the machine, it is likely his injury could have been prevented or its severity reduced.

No measures taken to prevent guard removal.

Emergency stop button on opposite side of machine from accident.

This case settled out of court to our advantage. Our expert knowledge of engineering design, the interaction of computer controls to run a machine, engineering and operational codes, and human factors were critical to settling this case favorably for the injured party.

President: Frank Owen, PhD, P.E.; 872 Toro Street; San Luis Obispo, CA 93401; U.S.A.
001 (805) 541 8608 (home office), 001 (805) 441 3995 (cell)
fowen@aoengr.com; www.aoengr.com