



These human factors bulletins focus on how workers interact with their work environments. They are based on accident investigations that examine all the workplace factors that influence the decisions and actions of the workers involved in an incident. These factors help to identify the causes of an accident. Identifying these causes can help to prevent similar workplace accidents.

Written procedures and actual practice

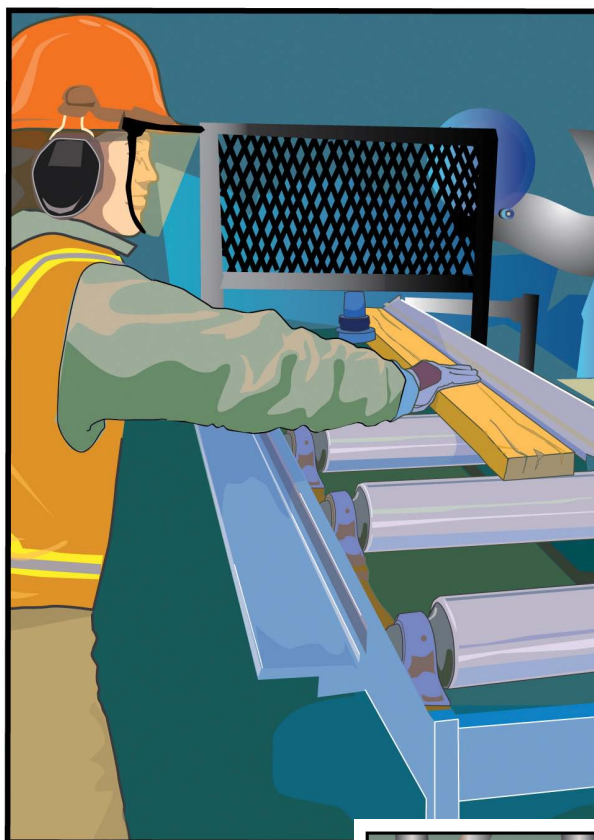
After a workplace accident, the failure to follow work procedures is often listed as a cause of a workplace accident. *If only they had followed the procedure!* is a phrase heard over and over again. And the label of complacency isn't enough to explain why workers don't always follow work procedures. This bulletin examines the factors — both physical and mental — that influence workers' actions that may be different from those stated in a procedure.

What happened?

In this incident, the operator was standing at the back of the in-feed table, feeding rough lumber into the machine. While doing this, another piece of lumber "kicked-back" and was ejected out of the saw, striking a piece of lumber on the in-feed table. This caused the piece of lumber on the in-feed table to come back sharply and strike a fatal blow to the chest of the operator, who was standing in its path. There were no physical barriers in place to stop the operator from standing behind the in-feed table. Also, there were no warnings or any other signs posted about a potential kick-back hazard.

From a human factors perspective, why did it happen?

Safe Operating Procedures (SOPs) specify that the operator of a multi-rip saw is to stand to the left side of the feed rolls and push boards through the machine using the right hand. The SOP states: **DO NOT UNDER ANY CIRCUMSTANCES STAND BEHIND THE RIP SAW FEED ROLLS AND ROLL CASE AS YOU ARE PUSHING BOARDS INTO MACHINE.**



In incidents in which procedures are not followed, we must ask ourselves why? It is important to understand the factors that drive behaviour that may be contrary to the procedures. To do this, the procedures need to be examined in the work context. Exploring these factors will provide the information needed to minimize the mismatch between procedure and practice and improve safety.

- **Workstation layout and task requirements:** The SOP tells workers to stand to the side of the feed rolls to push boards through the machine. But there are greater physical demands placed on the body in this position as compared to standing behind the machine.

The task involved repetitively lifting 2 x 8 pieces of wood from a lumber pile, inspecting, and pushing them into the multi-rip saw at a rate of approximately 6–7 boards every minute. Because of the operator's size relative to the in-feed table, the operator had to work in an awkward position with arms outstretched to the side at nearly shoulder height to feed wood into the saw. Over a 10 hour shift (excluding breaks), the repetitive, awkward, and forceful movements of the task placed high physical demands on the operator.

- **Machine and lumber:** On the day of the incident, the operator was processing rough lumber containing many defects. The lumber also varied in thickness to the point where the machine's in-feed rollers had to be adjusted an estimated 10 times. As well, the rubber rollers that the multi-rip saw originally came with had been replaced with steel rollers. Rubber rollers can accommodate larger variations in lumber thickness, making it easier to feed rough lumber into the machine. Processing rough lumber with a machine retrofitted with steel rollers increased the task's demands significantly.

The operator reported the physical difficulties of operating the machine, and in spite of numerous adjustments, was told repeatedly to follow the procedures.

The operator had read the SOPs and had been trained and shown several times how to use the saw. However, the operator didn't fully understand how the machine worked. This limited the operator's ability to recognize the hazard created by standing behind the in-feed table. As well, up until the incident, the only reported problems involved the saw stalling and small chunks

of wood being ejected. No one had ever witnessed a kickback forcefully ejecting wood out of the saw. The only other kickback reported was stopped by a second piece of wood on the in-feed table. Lacking specific, important information about the severity and probability of the kickback hazard lowered the operator's ability to accurately assess the risk.

Understanding human factors helps avoid workplace accidents

Many factors explain the operator's actions to load the machine from behind the in-feed table. These included:

- The physical demands involved with loading the rough lumber from the side of the machine
- There were no physical defenses to restrict standing behind the in-feed table
- The operator was experiencing and had reported significant discomfort
- The saw's rubber rollers were replaced with steel rollers, adding to the task's demands
- The operator didn't fully understand the hazard associated with kickback
- No one had witnessed a forceful kickback ejecting wood out of the saw before this incident

These factors created a large gap between the actual work to be done and the written procedures. This gap weakened the effectiveness of the procedures to protect the worker while doing the task.

While installing a physical barrier will restrict access to the end of the in-feed table, still, the reasons behind the worker's actions must be dealt with to improve worker safety. An effective solution would focus around the factors that drove the worker's behaviour.

If the safety of a worker primarily relies on the worker following a set of procedures, recognizing that a mismatch often exists between the procedure and actual practice is critical. To lessen the mismatch, workers and management need to search for the reasons why a gap exists, and find safe solutions. Simply telling workers to follow procedures is not enough.