

CNC Lathe Window Guard Failure Analysis:

A lathe observation window failed when struck by a workpiece, leading to severe injury. The shop owner was operating his newly purchased CNC lathe at his company in northern lower Michigan. During a hole-cutting operation, the 27 lb cylindrical workpiece came loose from the rotating chuck and was ejected through the vision panel, critically injuring the operator. This was the second serious injury of this model machine with this vision panel design, with the first accident resulting in the machinist's death. I determined that the window was a safety device, that this type of accident was foreseeable, that the window was defective, and that it was the proximate cause of the injury. I destructively tested numerous windows over two days to determine the kinetic energy involved in the event, and the ability of a redesigned window panel to protect the operator. The testing involved shooting comparably sized steel workpieces into composite windows at varying velocities to confirm the actual kinetic energy of the accident workpiece, and also to test a redesigned window to the limits of the lathe's ability to throw workpieces from the chuck. Images of the testing are shown below:



Images from lathe window test. Top – Pneumatic gun for launching workpieces. Lower Left – tested window with rebounding workpiece. Lower Right – Condition of window post Test 5.