

## **Backover Hazard - Rear Bumper with Collision Sensor**

Back-over accidents on riding lawnmowers are often very serious. Children approach a mower from behind, and the mower operator may not see the child due to the size of the child and the direction at which the child is approaching. A 1962 article on this horrible accident scenario called for guards similar to cowcatchers on steam engine trains, at the front and rear of the mower. This would prevent a child from being run-over and injured by the mower blade.

Another guarding solution was developed at the University of Iowa. It incorporates a rear bumper and a blade brake and clutch. If the mower bumper contacts a child, the blade clutch disengages and the brake stops the blade. The co-author developed a similar system. This system consists of a bumper/sensor which attaches to the rear of the mower. When the mower backs into something, the engine is immediately stopped, and the driver can attend to the source of the collision.



Figure 23 Prototype of Bumper/Sensor Attachment.

Figure 23 shows the bumper/sensor mounted on a lawnmower. This bumper is a hollow tube that can detect the occurrence of a collision by sensing the increase in pressure caused by some object pressing against the bumper.



Figure 24: Side view of rear collision detector bumper

This increase in pressure will send an electrical signal to the circuit board of the device. The pressure-increasing signal triggers another switch on the circuit board that shuts the engine down. The electronics design opens the shut-off switch for 5 seconds, which kills the engine. After the timed out 5 seconds, the open switch closes and the mower can be restarted.