

The ElectroShear 2000 System Concept Document*

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The ElectroShear 2000 is an automated sheep-shearing system used to efficiently collect wool from flocks of sheep (see Figure 1). The following is a first cut at a conceptual design by the system engineers. Feel free to change the design for safety reasons, but be prepared to justify your changes because the system engineers spent a lot of time on this design and they like it a lot.

The system will start with the exit gate closed and the entry gate opened. A sheep will be loaded into the ElectroShear 2000 and the entry gate then will be closed, fully enclosing the animal. Three sensor systems will be employed to detect the presence of a sheep:

1. A single weight plate that triggers on typical ewe to ram weights.
2. A digital camera to detect sheep shapes (whether the images are to be processed by a computer or human is still to be determined).
3. A thermal sensor that detects typical sheep body temperature.

The sensors are used during the startup process.

Four shearing arms (front, back, and both sides) shear the wool from the sheep. Each mechanical arm (shearing arm) is equipped with an electric trimmer and two sensors (on the end of the shearing arm inside the enclosure). The first sensor detects whether wool is in fact being trimmed. The second sensor detects distance to the animal's skin on both sides of the trimmer, making it possible to get a flush fit with the trimmer and maximal yield of wool. If the shearing arms are not flush to the skin, the sensor will report the distance so that the fit can be corrected.

Each shearing pen is only as large as a sheep in order to minimize sheep movement while being sheared. Across the top of the pen there are three openings (with a grate across them), two for the shearing arms to penetrate the pen and a third for ventilation within the pen.

When the sheep is finished being sheared, the exit gate is opened, allowing the animal to exit the pen. The exit gate is then lowered and the entry gate opened in preparation for the next sheep. The whole system is composed of multiple shearing pens being operated in parallel in order to process large numbers of sheep efficiently.

*Based on an idea by Jeffrey Howard and Patrick Anderson of Safeware Engineering Corp.

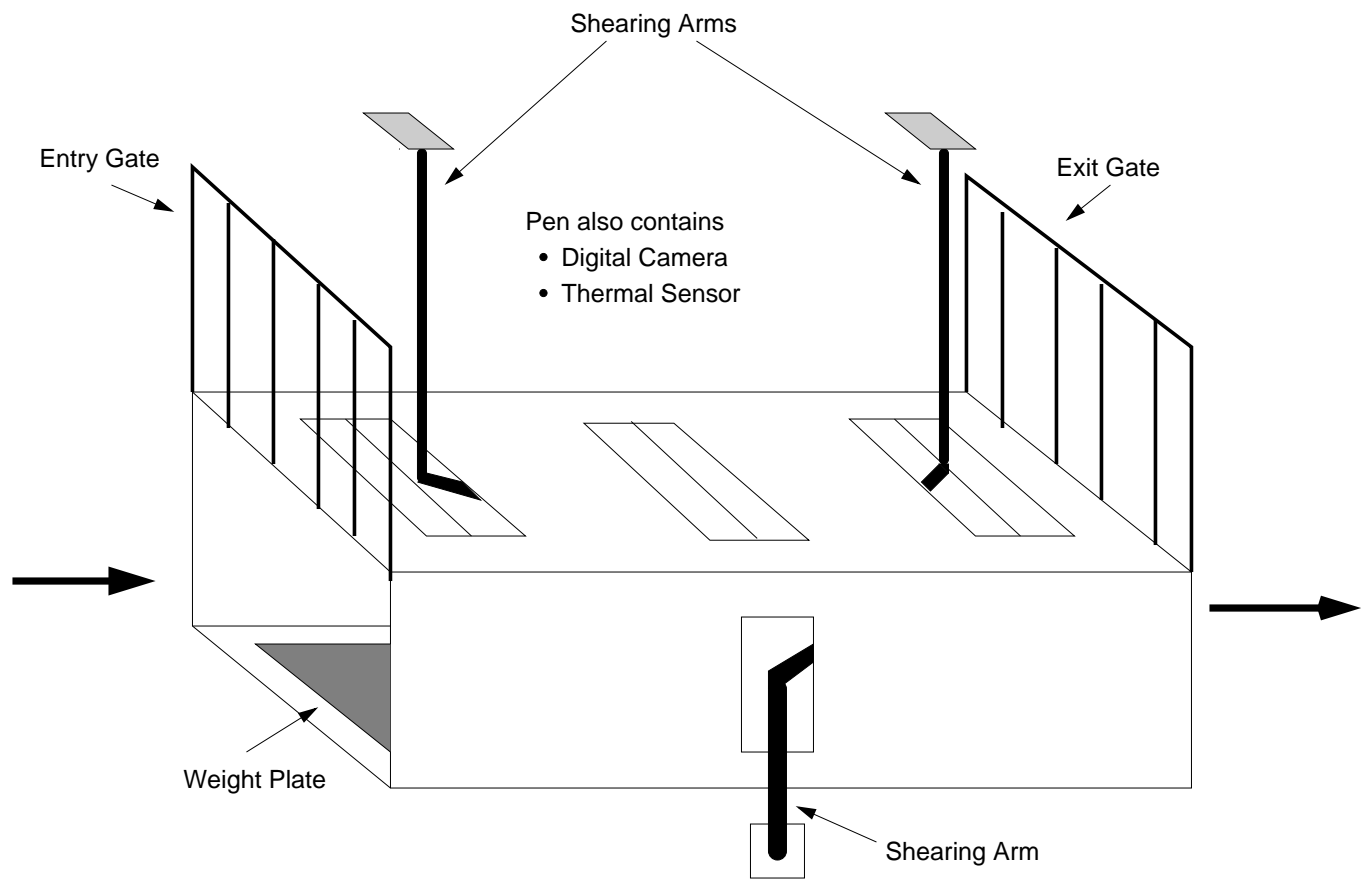


Figure 1: A Diagram of the ElectroShear 2000