

Grain Bin Interlock Safety System

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Problem Statement

Most grain bin entrapments occur when a worker enters a bin to free lodged grain from the unloading auger while it is running.

Solution

Prevent grain bin entrapments by developing a safety system that disables the unloading auger at entry while still allowing grain flow to be monitored.

Deliverables

Educational safety display model with interlock system installed

Wiring schematic of system

Cost Analysis : Total to install a system = \$650.00

Project Application

The Indiana Rural Safety & Health Council will use the grain bin model as an educational training tool and safety display at the Indiana State Fair, National FFA Convention, National Farm Machinery Show and other safety programs.

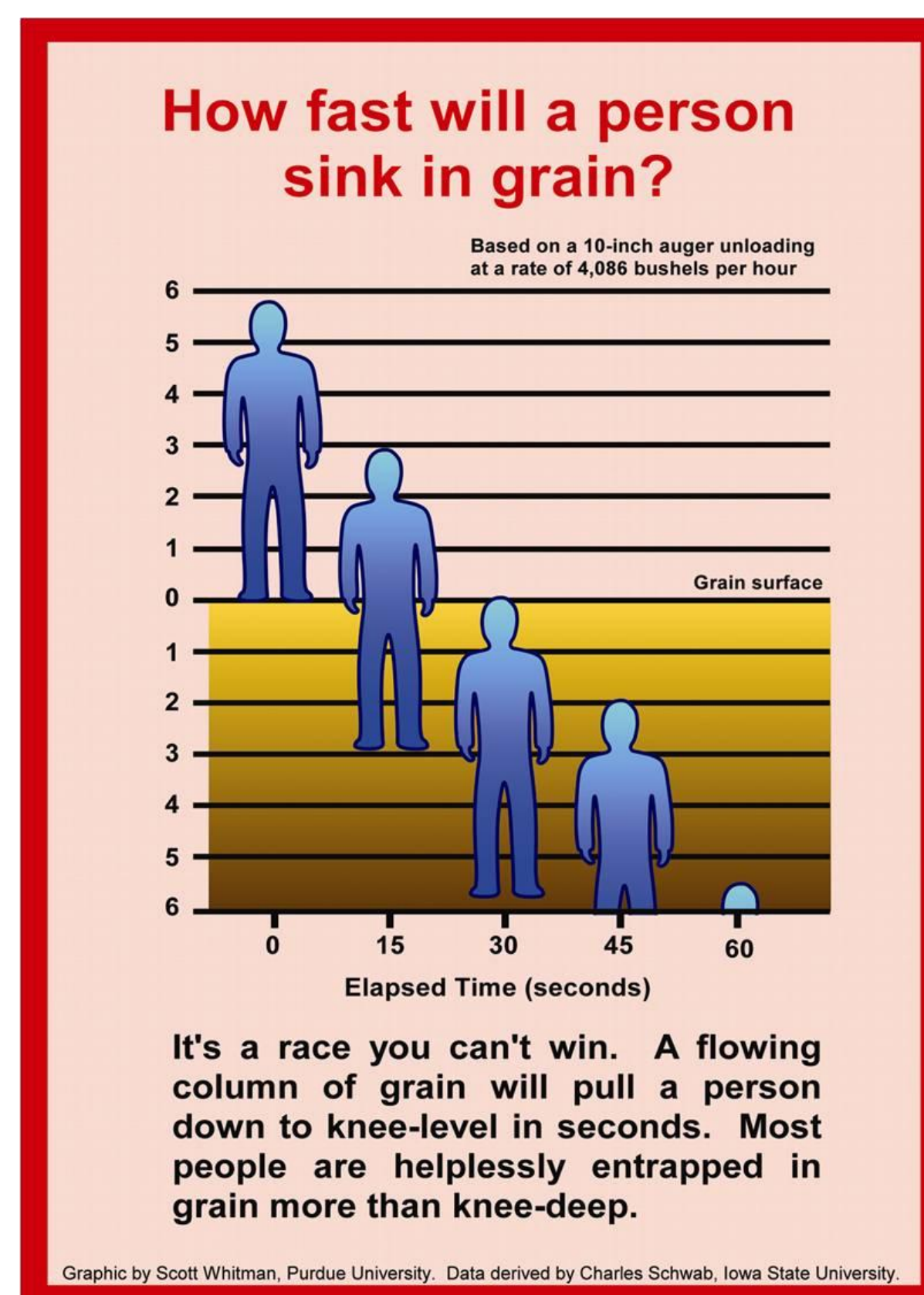


Grain Entrapment Problem

- Over 700 entrapments recorded since 1964
- 75% of cases were fatal entrapments
- 77% of entrapments occurred in corrugated storage bins
- 76% occurred while unloading grain from bin

Entrapment Cases are Rising

- In-experienced operators
- Increased on-farm storage
- Increased farm size



Concerns with Rescue Procedures

- Time consuming
- Complex
- Dangerous
- Most are unsuccessful



Approach to Final Solution

- ❖ Literature review of grain entrapments and consultation with safety experts, grain bin engineers, and professional electricians.
- ❖ Developed ideas to create a fail-safe solution to the identified problem
- ❖ Designed, built, and tested a model interlock system



Constructing base frame and attaching mounting plates for casters.

Building Process



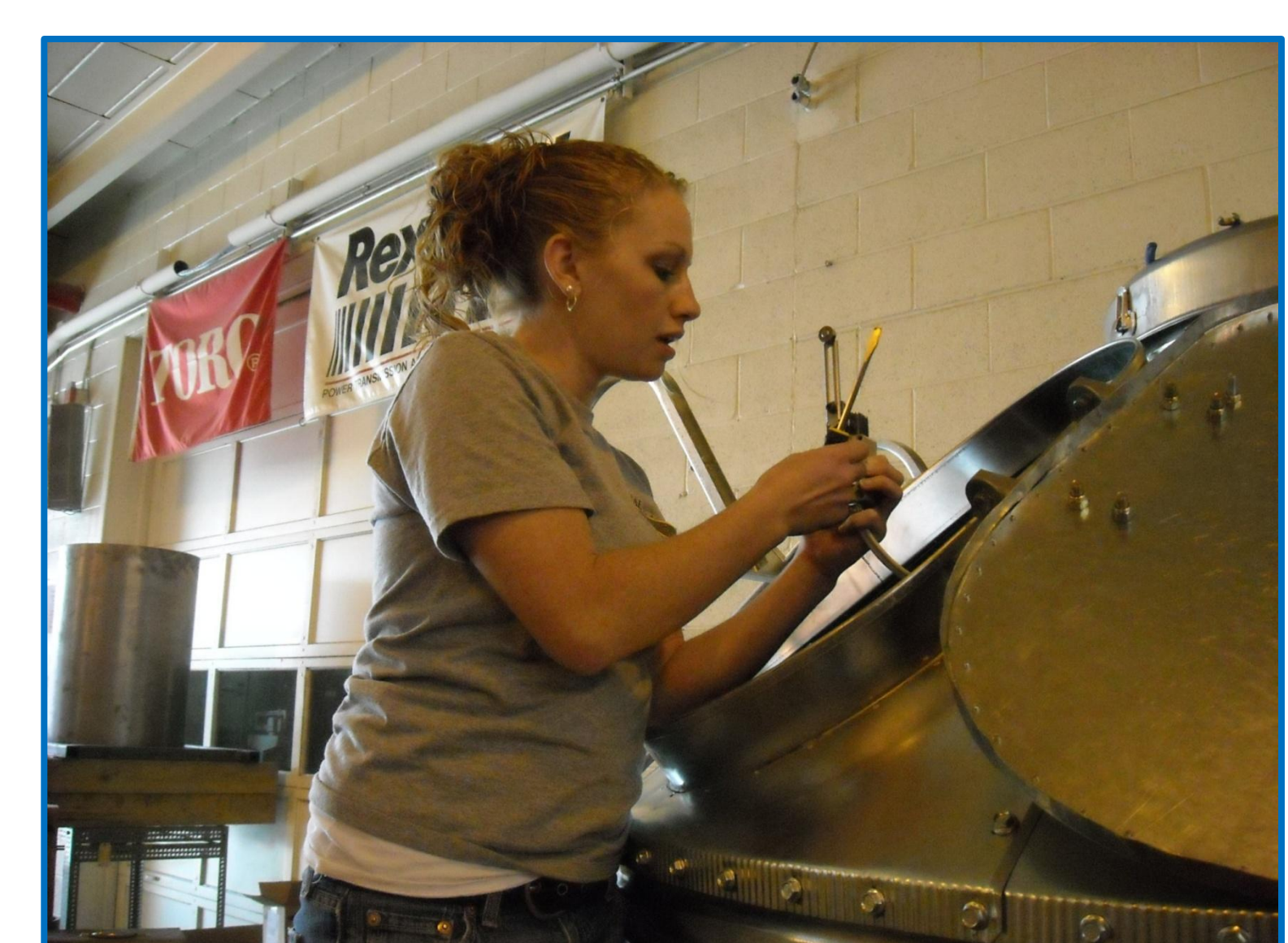
Electrical box, motor and contactor reset switch



Completed 6.5' x 6.5' base with U-trough auger



Grain bin assembly and fabrication



Installation of the limit switch to door frame



Interlock Safety System Design

Electrical Components

- ¾ hp Motor
- 15 amp fuse box with 120 V electrical outlet
- Start/Stop switch box
- Limit Switch (located on manhole door)

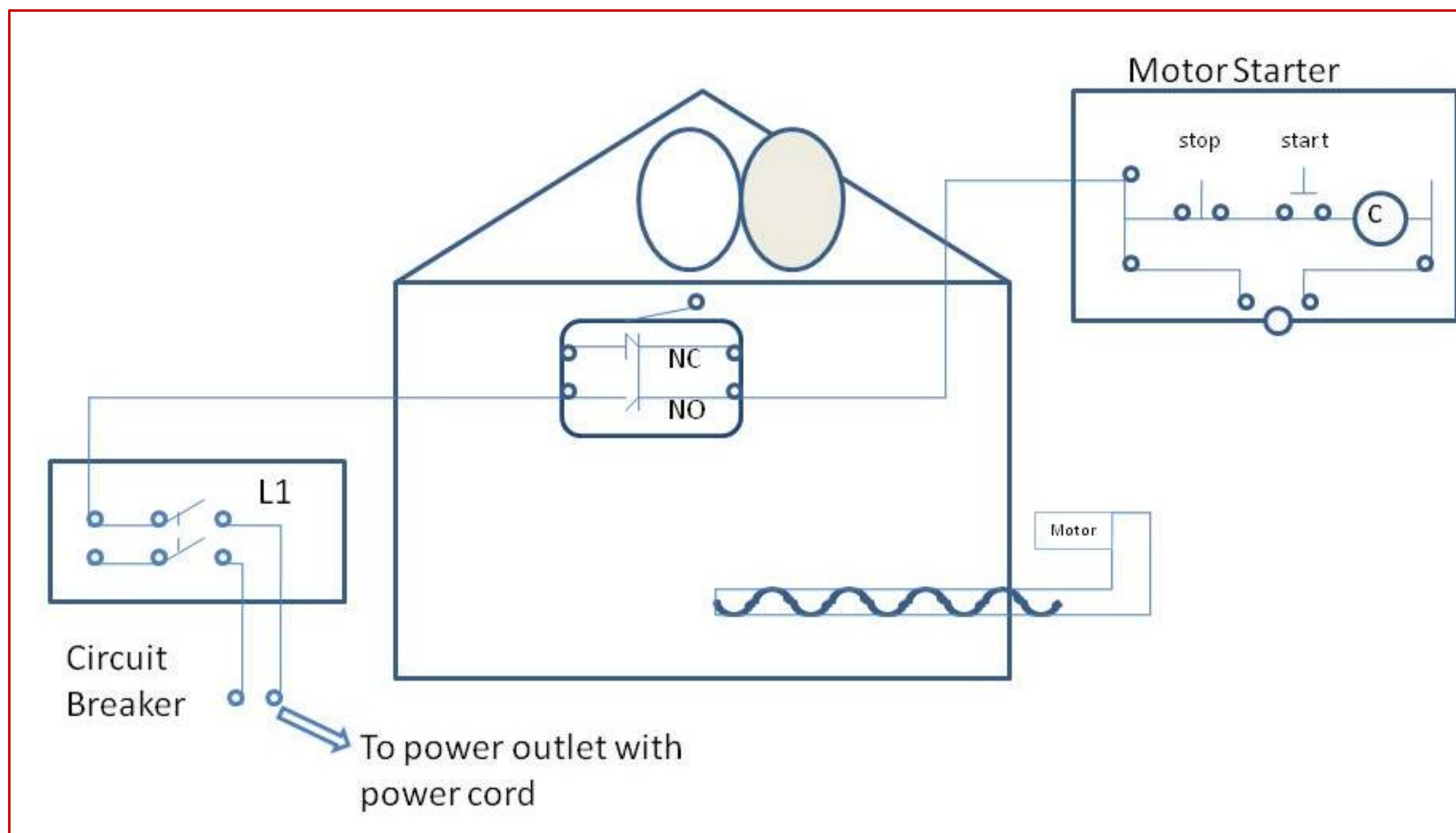


Limit Switch activated to shut off auger when door opened past 45° which allows grain flow to be monitored without entering bin.



Start/Stop switch to reset entire system once door has been closed

Wiring Schematic



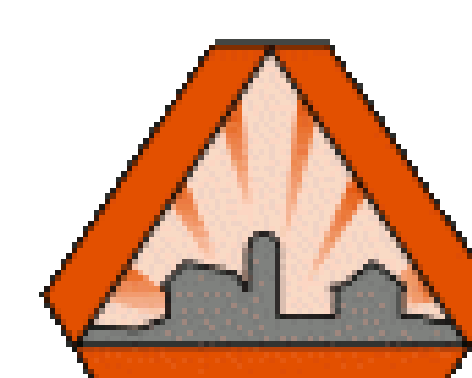
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