

2017196

by Jack Rogers

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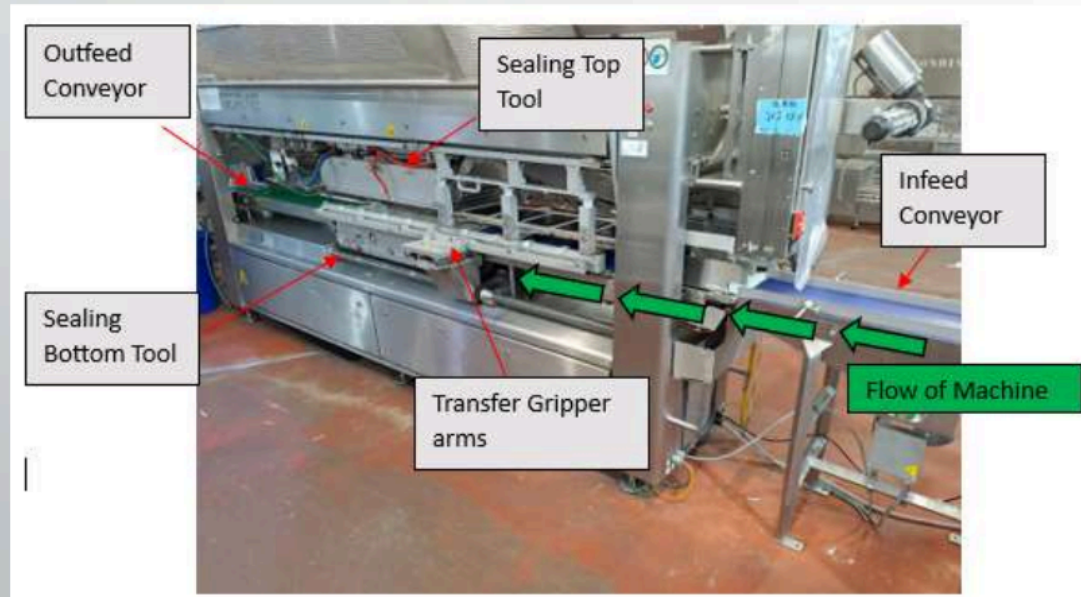


Pack Stopper Project

By Jack Rogers

Project Background

Diagram of Machine Layout

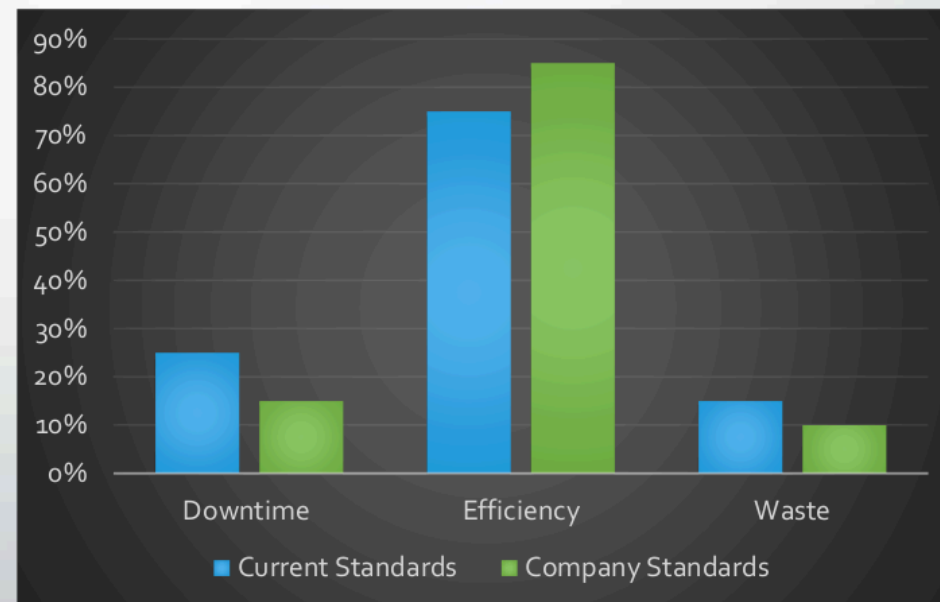


Existing HMI of Machine



Problem Definition

- 'Cycle not done' error message on HMI.
- The run rate of the machine is too slow.
- Risking Shorting customer orders.



Legal and Company Constraints

- **The Food Safety Act 1990**
- **The Electricity at work regulations 1989**
- **The Use of work equipment regulations 1998
(PUWER)**

Functional Design Specification

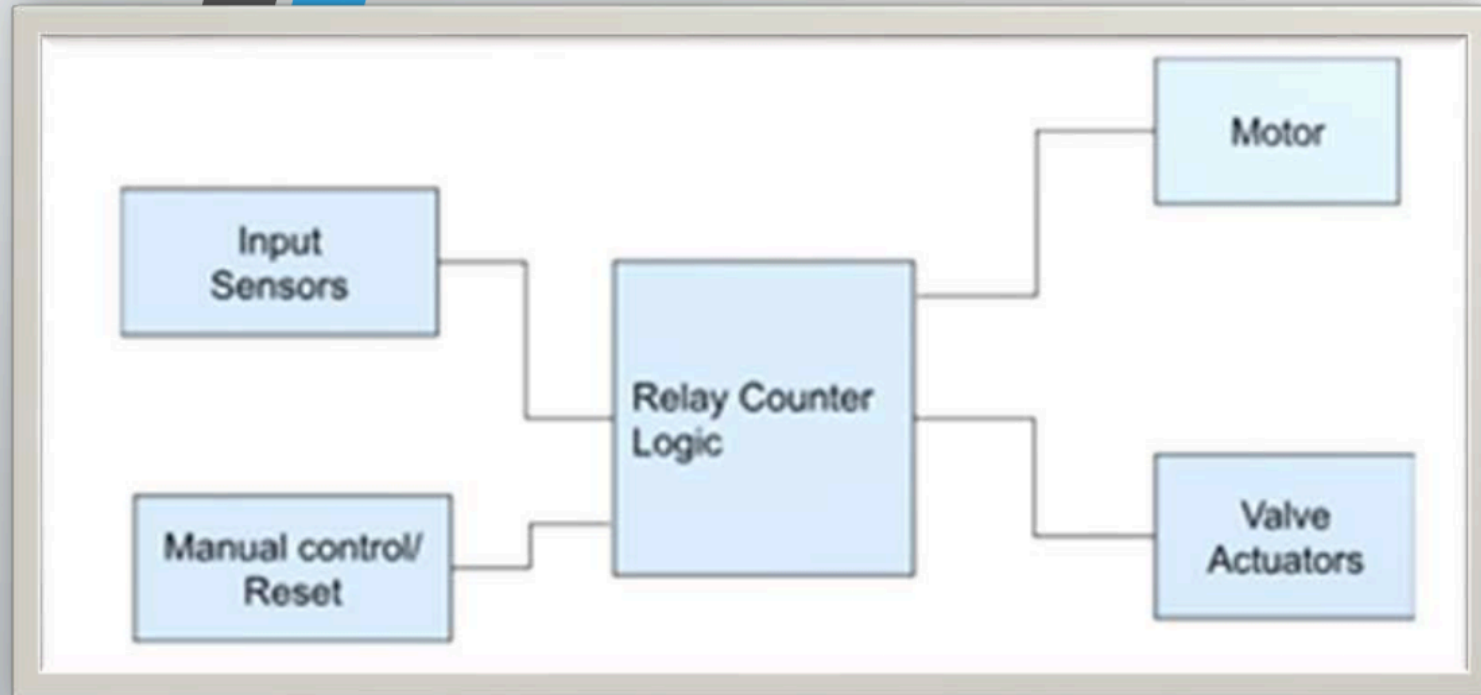
F.5	The system must have a Speed control method to operate from the new panel
F.6	The Stopper cylinders must be able to fire manually
F.7	Stoppers must remain closed until pack arrives
F.8	Stoppers must Release when pack arrives
D.2	The system must be able to read the speed of the infeed conveyor in terms of packs per minute
D.3	The machine must be able to count how many packs per minute (ppm) the system is actually producing.
D.4	The system must improve downtime of machine
P.1	Stoppers must count 5 packs then stop until cycle has cleared
P.2	The product waste should be below 10%
P.3	The system must produce downtime below 20%

Project Risks / Health and Safety Compliances

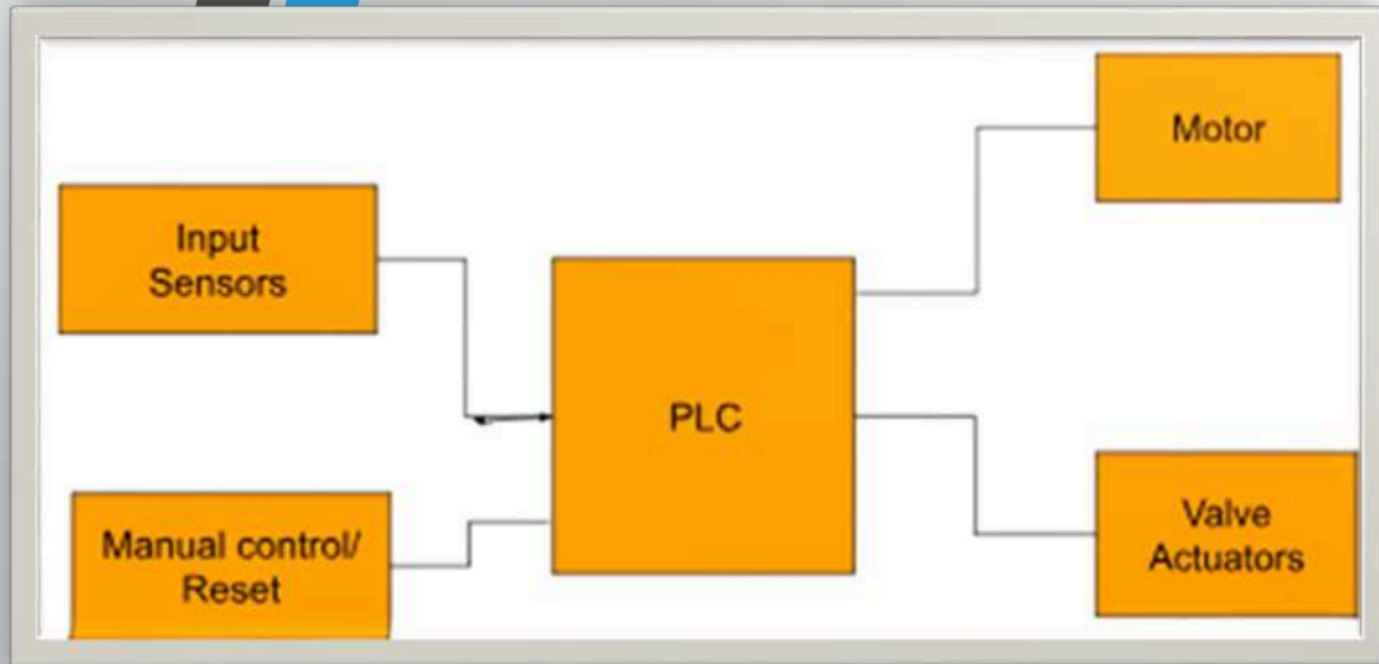
Hazard Description	Likelihood	Severity	Level of Risk	Control Measures
Jamming hand or fingers in between the pack stoppers	High	Medium	High	Make sure the stoppers are isolated by a guard to stop operations from putting their hands near it. Also, ensure correct and safe isolation for machine is nearby and present.
Electrical shock during installation.	Medium	High	Medium	Electrical safety protocols need to be followed, and correct use of PPE must be worn.
Slips, trips, and falls when installing system.	Low	Medium	Low	Ensure that the work area is clean and tidy and guarded off from production.
Noise hazard from vacuum pump for sealing machine	Medium	Medium	Medium	Hearing protection will need to be provided when working in are over 35dB.
Stoppers	Low	Medium	Low	Ensure that correct PPE and safety

Test Planning

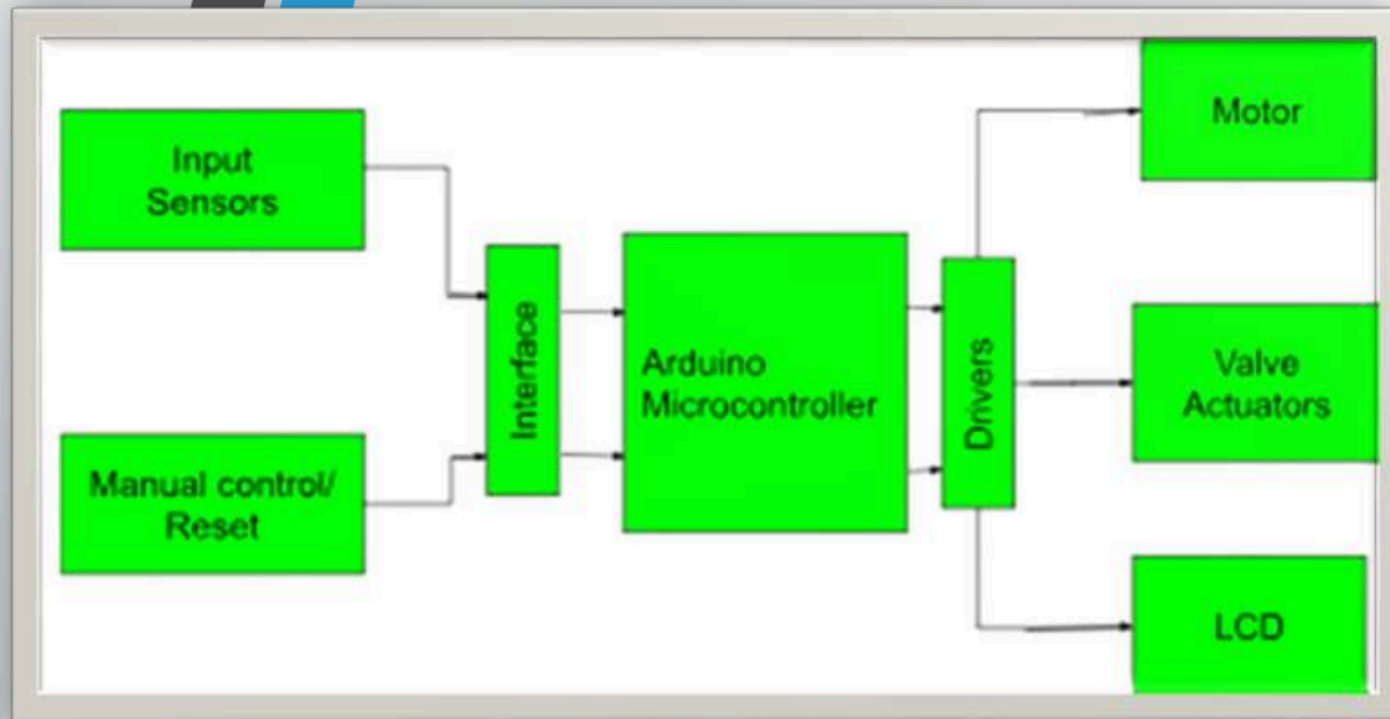
Test Plan Table						
Criteria/Ref No.	Requirement	Test Description	Expected Result	Actual Result	Decision Pass/Fail	Evidence
D.1	The system must be able to know how many packs goes into the machine	Put 5 packs onto the infeed conveyor of the machine.	The HMI of the existing machine shows that 5 packs have entered the sealing station.			
D.2	The system must be able to read the speed of the infeed conveyor in terms of packs per minute	Load up the infeed conveyor full of packs continuously.	The HMI of the existing machine shows the rate of PPM the Infeed conveyor is running at.			
D.3	The machine must be able to count how many packs per minute (ppm) the system is actually producing.	Load up the infeed conveyor full of packs continuously.	The HMI of the existing machine shows the rate of PPM the system is producing.			



Solution 1 – Relay Logic Controlled



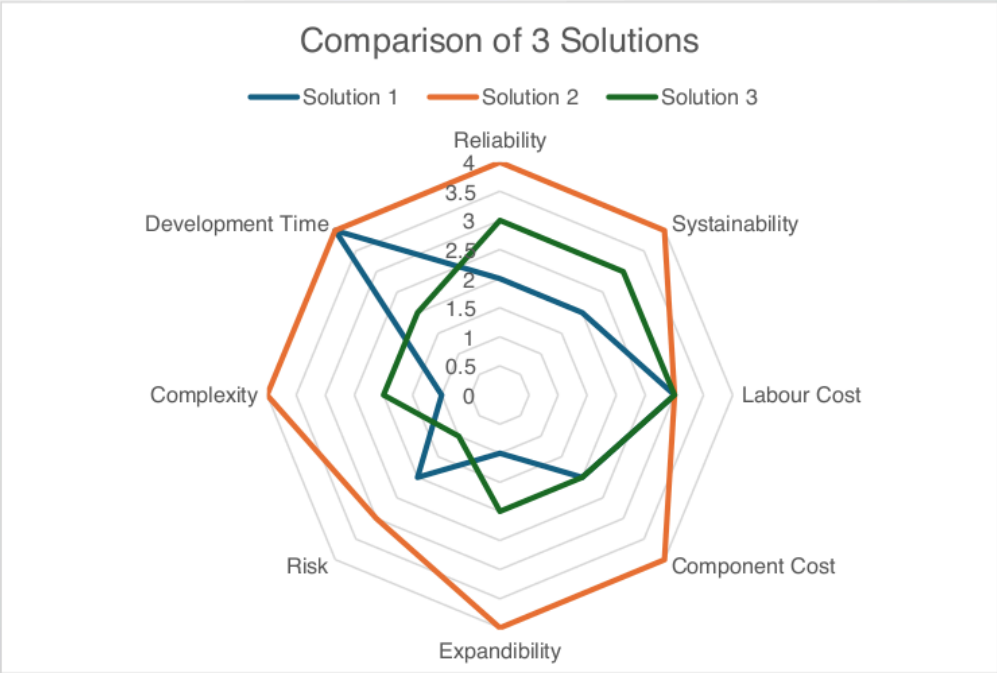
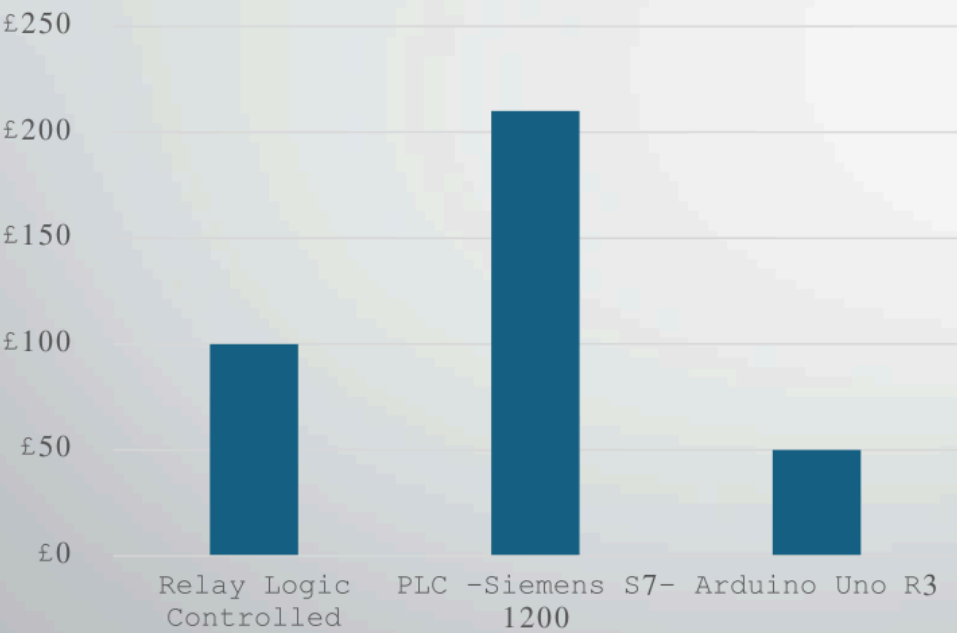
Solution 2 – PLC Interface



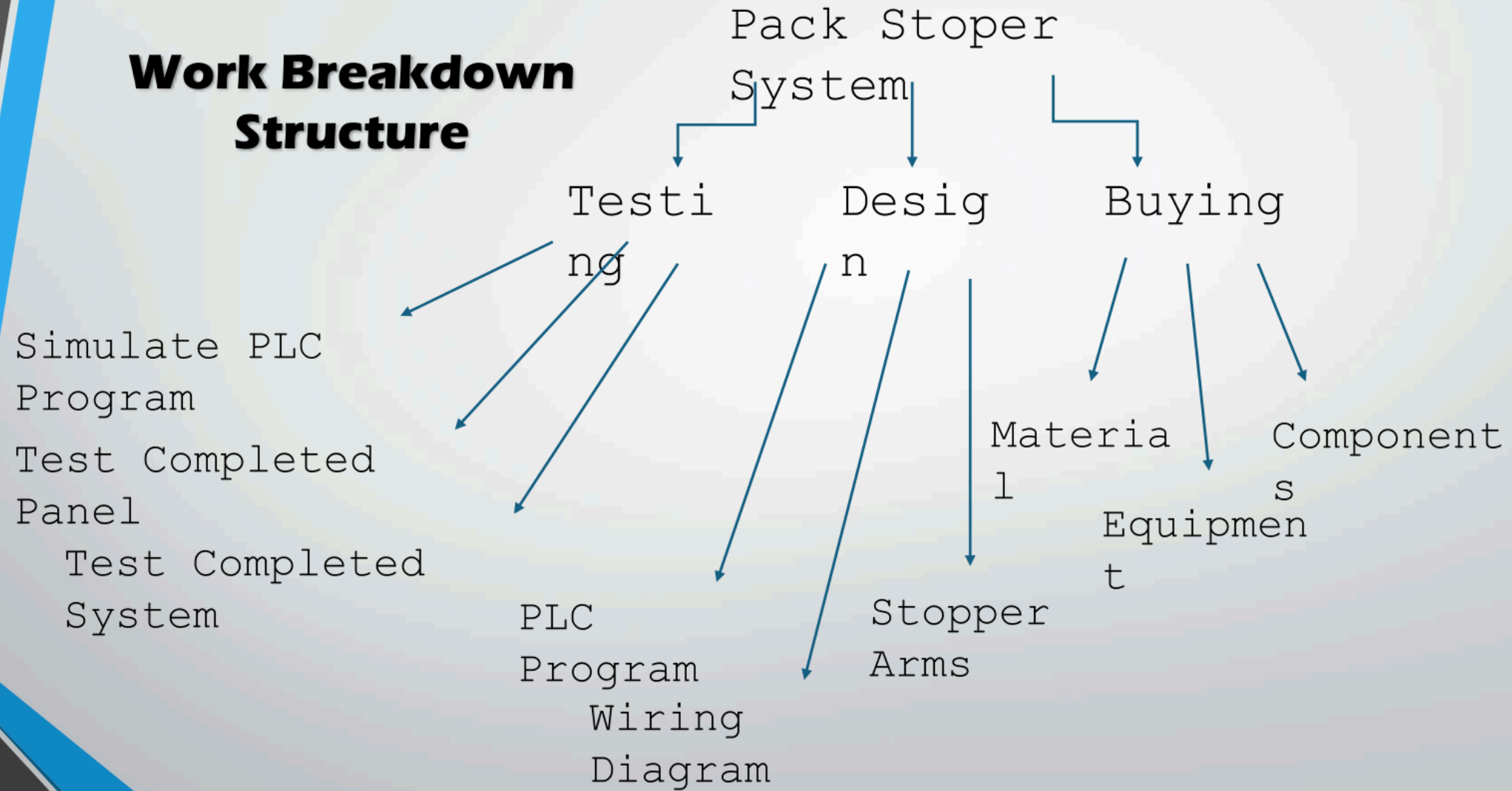
Solution 3 – Arduino Microcontroller

Chosen Solution 2

3 Solution Comparison



Work Breakdown Structure

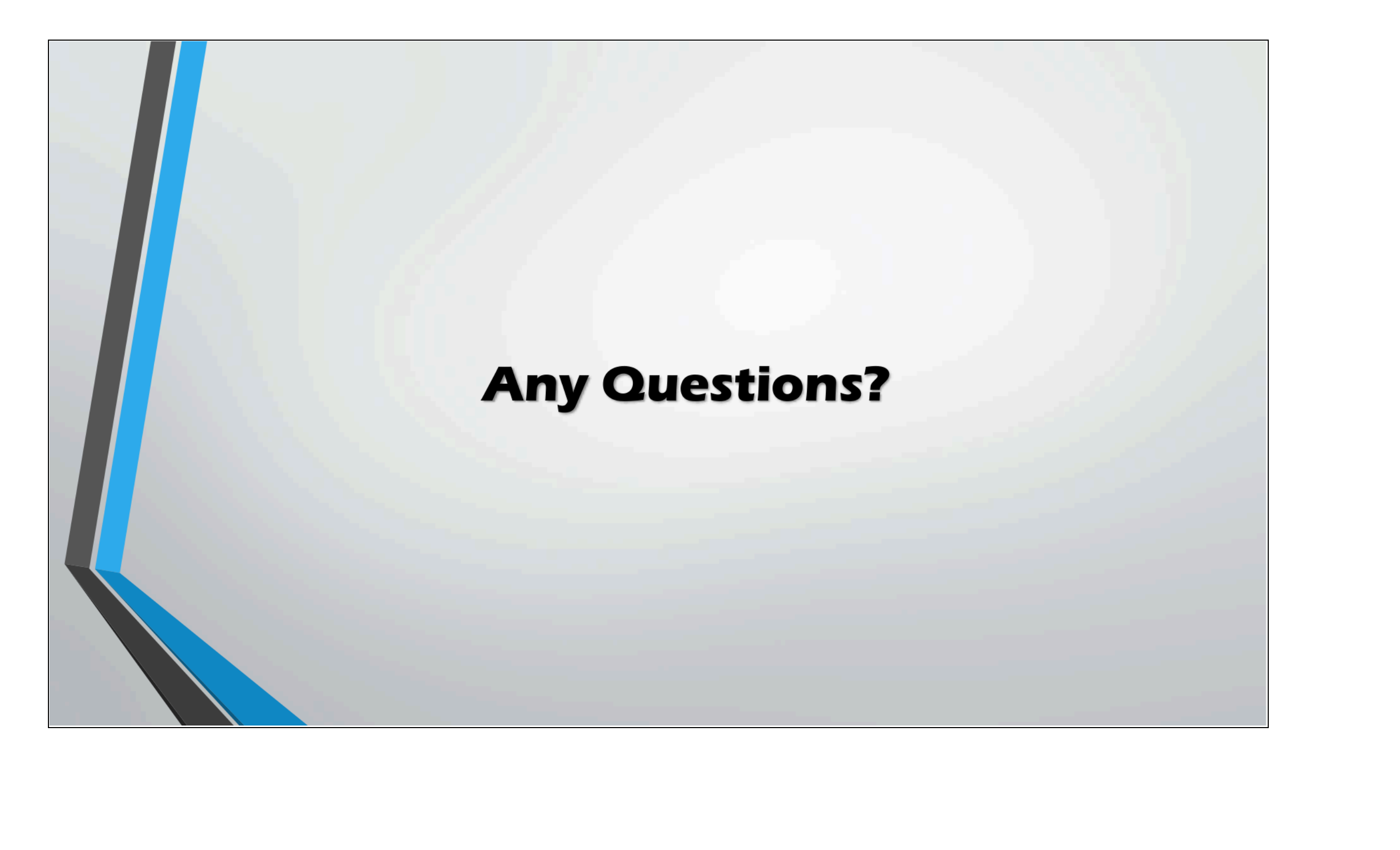


Project Planning

[illegible]

Progress made to date

[illegible]

The background features a series of concentric, light gray circles centered on a white circle, creating a ripple effect. A prominent diagonal stripe, composed of a thick blue line and a thinner black line, runs from the top-left corner towards the bottom-left corner.

Any Questions?

FINAL GRADE

GENERAL COMMENTS

60/100

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GRADING FORM: NEW CSG-RUBRIC

JACK ROGERS

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1. ENGAGEMENT WITH LITERATURE



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2. KNOWLEDGE AND UNDERSTANDING



Project background and problem definition (6/10)
Project constraints, risks, health and safety (6/10)

18

Response to questions (6/10)

18/30

3. COGNITIVE AND INTELLECTUAL



Functional Design Specification (6/10)
Test planning (6/10)
Project Planning and management methods (6/10)

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18/30

4. PRACTICAL APPLICATION



Review of Solutions (5/10)
Justification of final solution (6/10)

11

11/20

5. TRANSFERABLE SKILLS



Quality of the presentation slides (7/10)
Quality of the delivery style
Good (6/10)

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