

# Peerless Forming Die Test Press Hydraulic Motion Control System



**ECET 491**  
**Final Presentation**  
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Peerless Forming Die Test Press Hydraulic Motion Control System



## What Is Going To Be Covered



- The problem for Peerless & background Information
- General machine requirements & the implementation of safety
- MMC motion control components
- How the project was implemented with the Trade Off study
- Project Costs & Risks Analysis
- Machine Cycle Block Diagram
- Machine Videos
- Summary & Questions

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## The Problem for Peerless Machine



- The need for another Forming Die Test Press for Peerless GmbH
- The Parker PMC-20T control is no longer available
- Redesign with a new control system
- Design should be able to be adapted to the larger M24T machines that presently use the PMC-20T control

M24T  
→  
Uses the PMC-20T Control



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## Background for the Peerless Test Press



- Because the PMC 20T motion controller had been discontinued a retrofit motion control system needs to be developed for the existing (30) M24T machines in the field
- A new Forming Die Test Press was ordered for the Peerless Germany Plant in late 2008
- Original completion date of April 2009 could not be met because of overwhelming machine orders
- New date of April 2010 was set for completion and has been met.

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## General Machine Requirements



- Simulate the head speed (cycle time) of a production press which is 40 strokes/minute
- Be able to operate at four different "Head Open" starting positions
- Have a User Interface for selecting machine parameters and providing operator controls for operating the machine
- Forming Pressure = 20,000 lbs (10 Ton)
- Maximum Forming Head Velocity = 23.6 inches/second

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## Operator Safety is of Foremost Importance



- ❖ **Peerless Standards for Safety**
- Guard doors must be closed when there is stored energy and motion is expected
- Sliding guard door open = safety pins are engaged
- Manual Mode; the only way to start the hydraulics is with the press of two palm buttons simultaneously
- Protective guards ensure that the operator can not reach into the machine when motion is taking place

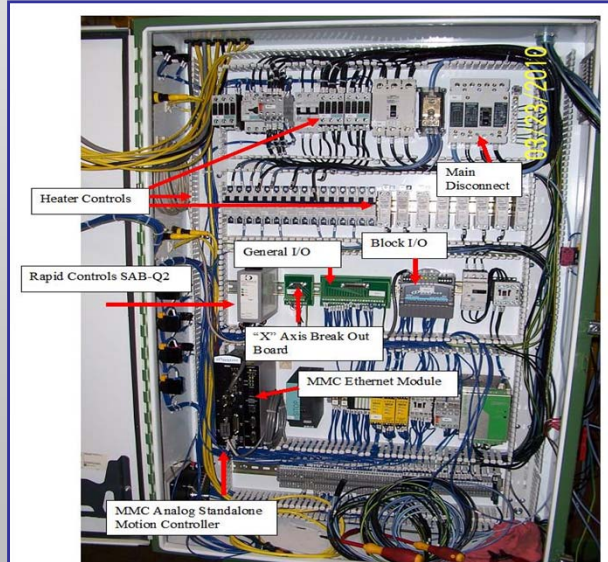


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## Motion Control Components



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## How the Project was Implemented



### Peerless Forming Die Test Press Project Trade Off Study

Criteria:	Delta RMC Series		G&L MMC Standalone	
	Brand:	70 & 100		
Control Components are Reasonable Cost		✓		✓
Control Programming is Familiar				✓
Familiar HMI Development Software				
Need to Purchase Control Software		✓		
Need to Purchase HMI Software		✓		✓
Parts are already kept in inventory				✓
Can be adapted to the larger M27T machine				✓
Fully Supported		✓		✓

- Inventor Design Software for the Mechanical Design
- PicPro 17.0 Software for Motion Controller Programming (Ladder Logic)
- Information Designer for Human Machine Interface Design
- Auto Cad Electrical for the Electrical Circuits Design

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## Project Costs



Description	Time (Hrs)	Cost
Electrical Components		6,060.24
Control Components		6,302.04
Hydraulic Components		18,588.98
Engineering Time	340	10,200.00
Assembly and Manufacturing Time	160	4,800.00
Guards and Framework & Misc.		15,240.59
Total Project Cost:		61,191.85
Sell Price		63,730.00
Profit		2,538.15
Values Shown are in USD		
Hourly Rate Multiplier for this project		30.00
Quoted Price of the Machine		63,730.00
Amount of time allotted to Engineering, Assembly and Manufacturing		15,000.00
Amount allotted to Components		48,730.00

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## Risks Analysis



- 1) Extended debug time
- 2) Missing the completion date
- 3) Missing budget
- 4) Hydraulic System is late
- 5) Components are late
- 6) Consultants help required

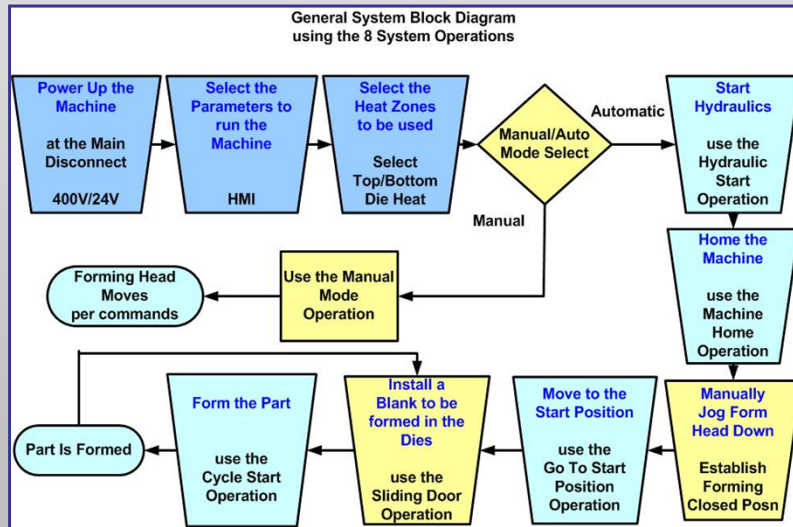
Severity of Consequence	Likely Hood of Occurance				
	Will Not Happen	Not Likely	Likely	Very Likely	Will Be Necessary
Catastrophic					
Critical		4	1		
Marginal		2,3,5	6		
Negligible					

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## Machine Cycle Block Diagram



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## Video Presentation



- Video presentation starts here and will be approx 10 minutes in length

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## Video 1: Overall Machine



- This video will introduction the audience to what the Forming Die Test Press looks like from the rear & front of the machine
- A close up view of the forming die area
- [Show Video 1](#)

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## Video 2: Safety Systems



- This video will introduce the audience to the Safety Systems on this machine
- A starting with the opposite operator side (rear)
- Ending with the operator side (front)
- [Show Video 2](#)

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### Video 3: Machine Controls



- This video will introduce the audience to the machine controls
- First will be the Machine Controls available from the HMI
- Last will be the Machine Controls on the operator side of the machine electrical enclosure
- [Show Video 3](#)

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### Video 4: Hydraulic Controls



- This video will introduce the audience to the hydraulic controls
- First an overall view of the hydraulic system
- Last will be a look at the individual components of the system from the volume stop on the pump to the axis lock solenoid valve
- [Show Video 4](#)

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## Video 5: Setup & Machine Cycle



- This video will take the audience through the setup process & then through the process of running a machine cycle.
- [Show Video 5](#)

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## Summary



- Conclusion
- Lessons Learned

Thanks to Mr. Garth Miller for his work in these videos  
See his work at [www.number46productions.com](http://www.number46productions.com)

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## Questions



Are there any questions at this time?

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