IPRO 312

Rapid Manufacturing of Casters

Sponsored by:
Colson Associates
OUTLINE

- Objectives
- Research
- Approach
- Concept design 1, 2 and 3
- Manufacturing concepts
- Conclusion
OBJECTIVES

- Satisfy “Special Rush Orders”
- All processing must be done In-Factory
- Adaptable design for fast processing
- Exclude wheels and brakes
RESEARCH

- Talk to existing experts
  - Plant visit to Albion
  - Drawings from Colson
- Understand performance requirements
  - Obtained copy of ICWM-2004 standard
- Investigate different caster components
APPROACH

- Divide into three groups
- Each presenting an alternative concept
- Reduce time consuming processes:
  - Heat treatment
  - Stamping
  - Welding
  - Coating
Goals

- Supply a familiar product for a well established market.
- Remove Process of Welding
  - Eliminate need for special fixtures
  - Reduce cost between use of skilled worker vs. assembler.
- Identify customer’s special needs and accommodate them with a *FLEXIBLE* DESIGN
Customer’s Special Needs

- Unique Stem Designs
- Varying Mounting Plates
- Different Fork designs
  - Accommodating varying types and sizes of wheels
Advantages

- Flexibility to customize design:
  - Fork
  - Top plate / Stem
- No welding
- Multiuse of laser:
  - Heat Treatment
  - Cutting
CONCEPT - 2
Goals

- Standard bearings
  - No Heat Treatment
- Less manufacturing processes and machines
Advantages

- Removal of Heat Treatment:
  - Standard Bearing

- Less manufacturing processes:
  - Turning
  - Water jet or laser cutting

- No special tooling required for different products.
CONCEPT - 3
Goals

- Reduce lead time
- Focus on simplifying design
- Tried starting from scratch
  - Designed 2 possible concepts
- Less parts = Less failure points
No–Torque Spherical Caster: Design 1

This area is full of balls that act as a bearing and hold main sphere in place.

Top plate would be standard sheet steel and could have hole in center in order to load in balls after weld.
No-Torque Spherical Caster: Design 2

- Empty space
- Ring of balls takes vertical load and can roll in any direction

Experimental Height
MANUFACTURING PROCESSES

- Reduced lead time
  - “In by 8 am, out by 5 pm”
- Customizable design
  - Computer programs
  - Flexible part designs
- No Outsourcing
- Sell one – Make one
FUTURE RECOMMENDATIONS

- Prototypes for caster concepts
- Cost analysis
  - Obtain new machines
  - Make caster from scratch
- Colson facility capacity investigations
- Testing
  - Safety
  - Durability
QUESTIONS