

Collaborative Engineering

Design for Manufacturing- TKP

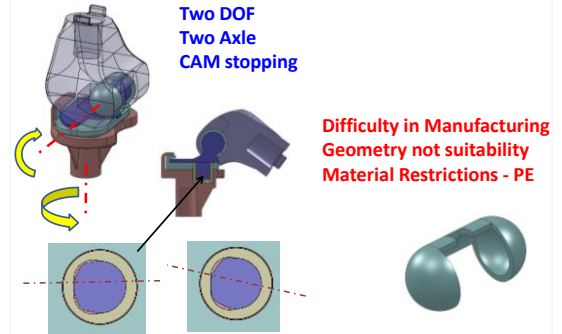


PresenterMedia

- Design Eliminations
- Geometry Changes
- Surface Finish
- Summary

OrthoCAD Lab, I.I.T. Bombay

Concept Elimination – Manufacturing

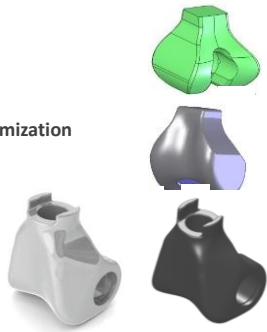


DFM – Design Changes

Process: Investment Casting

Design Changes: Condyle

- Geometry
 - Complex Curvatures optimization
 - Undercut removal



DFM – Design Changes

Process: Plasma Spray

Design Changes: Collar

- Geometry
 - Two Piece – Modularity, Cost
 - Collar Thickness
 - Exposed surface area



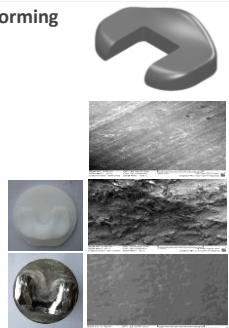
DFM – Surface Finish

Process: CNC Machining – Hot Die Forming

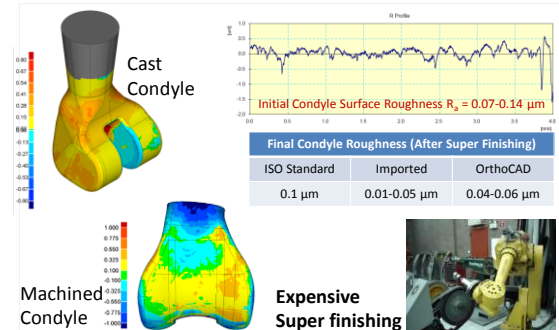
Surface Finish: Spacer

- Roughness Value
 - Input Mat – 0.5 - 0.8 μ
 - Machined – 0.8 - 1.2 μ
 - Mach. + Hot Die Forming – 0.4 - 0.6 μ

Expensive and Controlled Hot Die Forming



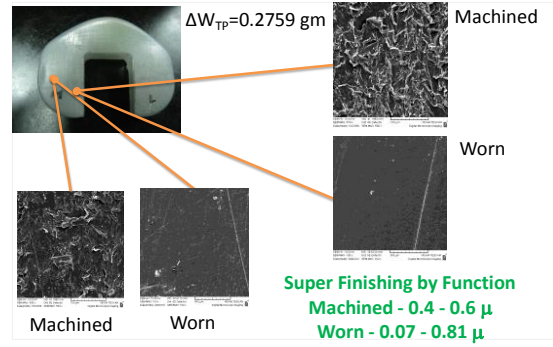
DFM – Surface Finish



Surface Finish Comparison

PART NAME	ISO Standard	Max R_a Value , μm	
		Achieved	Imported
CONDYLE (Co-Cr)	0.1	0.04-0.06	0.01-0.05
TIBIAL POLY (UHMWPE)	1	0.3-0.8	0.44-0.9
CONDYLAR BUSH (UHMWPE)	1	0.28-0.56	0.9-2
TITANIUM PARTS	0.1	0.07-0.3	-
CENTRAL PIN (Co-Cr)	0.1	0.04-0.06	0.1-0.2

DFM – Surface Finish – 100 K cycles



SUMMARY

- Manufacturing Feasibility
- Concept Elimination
- Geometry changes
- Functioning can affect mfg – surface finish

