

Drag Finishing of Tibial Implants

A Solution to the 2023 Tibial Tray Demand Spike

Nathan Gunter

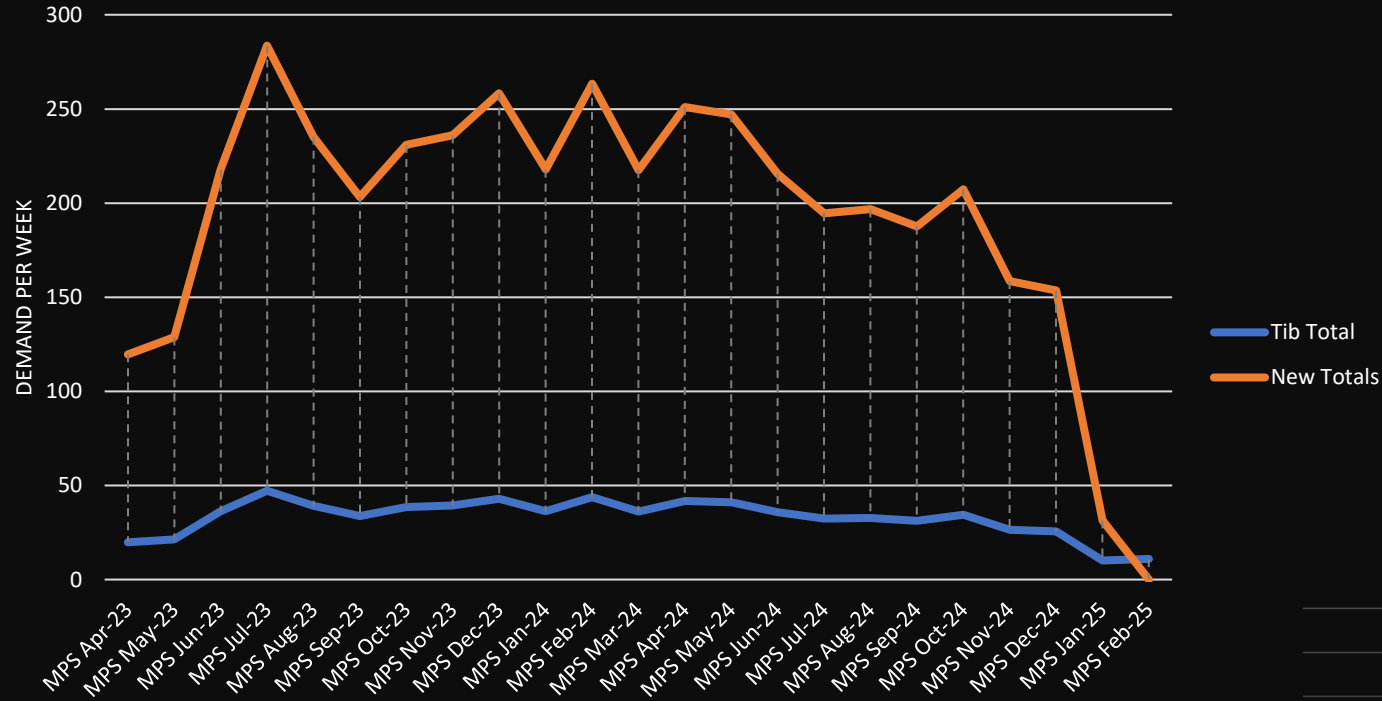
ACPA7002 - Financial Management and Planning

Project Appraisal

Problem

- Changes from the US FDA and BSi have resulted in a massive remediation effort of existing Design History Files for the current Zimmer Biomet portfolio.
- This means that products that do not have a new certificate conforming to the latest requirements from notified bodies cannot be manufactured or sold.
- Product that has already been manufactured and currently in stock can still be sold.
- This has resulted in a massive shake up of production planning and scheduling to ensure that critical products are “on the shelf”, while the company deals with the massive remediation task.
- Manning and cell capacities are now major issues at ZB Bridgend for tibial implants.
- **ZB Bridgend has until February 2025 to fulfil the whole demand.**

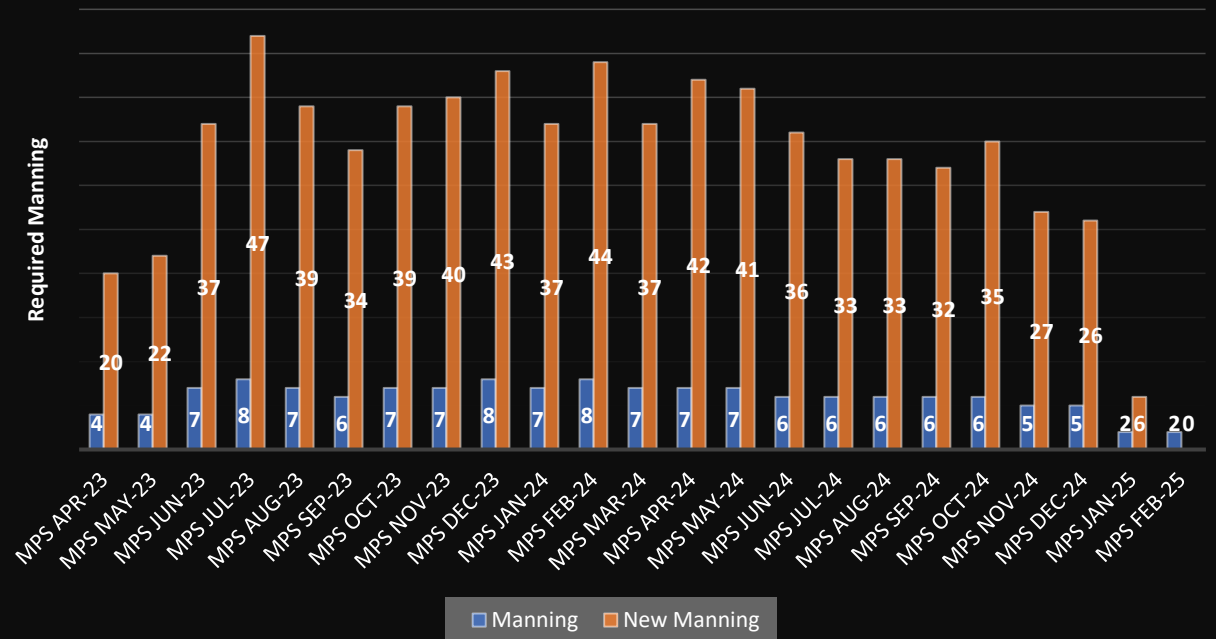
Tibial Demand



Increased weekly demand has resulted in an increase in required manning

Demand from 2023 and beyond has been pulled forward

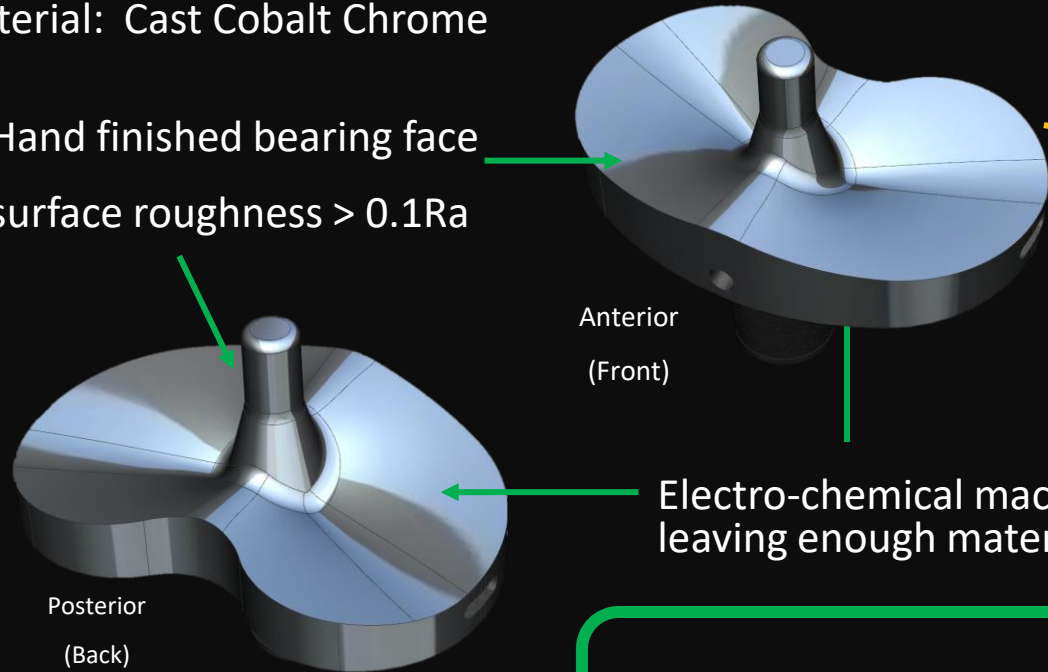
Manning Levels



What is a Tibial Implant?

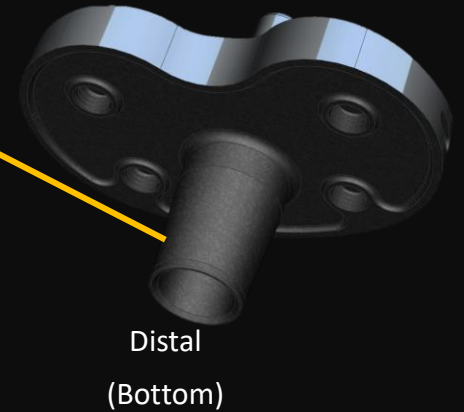
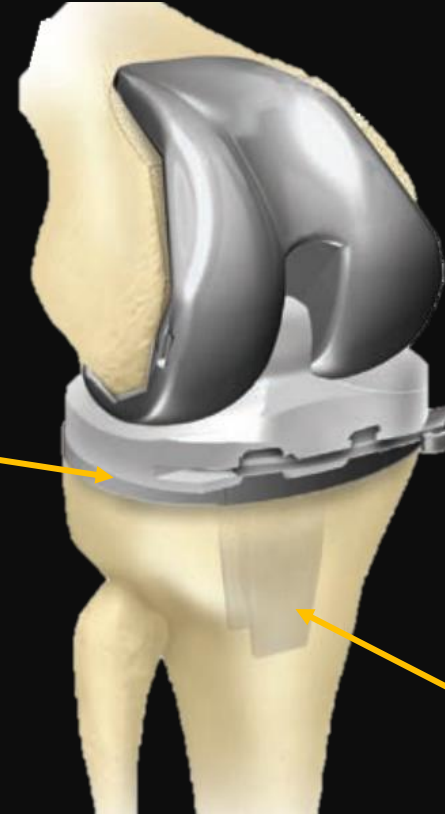
Material: Cast Cobalt Chrome

Hand finished bearing face
surface roughness $> 0.1Ra$



Electro-chemical machined face
leaving enough material for finishing

Processing Time: 72mins

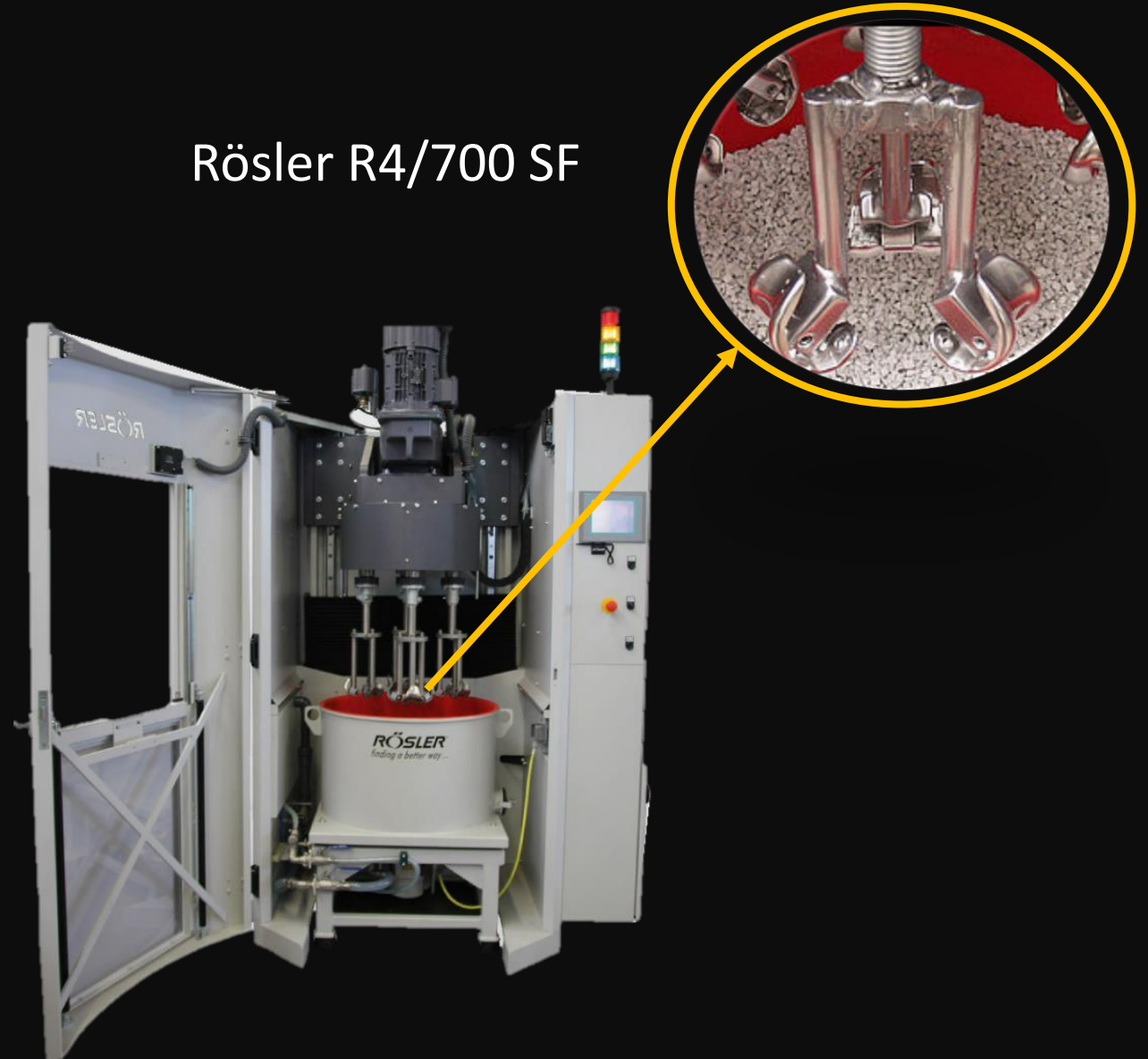


Drag Finishing

- Rösler R4/700 SF Machine Frame £50,300
- D1-4/320 SF Metering Unit £1,460
- P9 Exhausting Pump £1,950
- Automatic Water Level Adjustment £1,980
- Positioning Workstations £1,520
- Immersion Depth Control £1,780
- R4/700 SF Vibrating Bowl £4,370
- Additional Work Bowl £2,530
- Wastewater Treatment Plant £23,030
- DP1 Coagulation Metering Pump £840
- D2-4/350-Z Metering Unit £1,160
- Delivery and Installation £5,270

Total Investment £96,190

Rösler R4/700 SF



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Validation Costs

• Re-validate Wash lines	£14,079.60
• 360 parts @ £39.11/each	
• Biocompatibility Testing	£20,000
• Purchase Polishing media & Liquids	£1,322.70
• 4 weeks supply for validation build	

Validation Total	£35,402.30
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Total Investment £131,552.30

Drag Finishing Cost Analysis

	Current Method Batch of 6	Drag Finished Batch of 6	Drag Finished Batch of 12
Batch Cycle Time	432 mins	180 mins	180 mins
Consumables Cost	£54.66	£33.17	£33.17
Labour Time	432 mins	60 mins	60 mins
Labour Cost	£180	£25	£25
Cost per Batch	£234.66	£58.17	£58.17
Cost per Component	£39.11	£9.70	<u>£4.85</u>

Drag Finishing Cost Analysis-Savings

	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25
Manual Cost (£)	£18,772.80	£25,177.06	£34,086.04	£55,489.44	£36,809.62	£31,805.58	£45,157.63	£36,919.84	£40,413.67	£42,605.46	£41,209.50	£34,043.56	£49,091.43	£38,666.12	£33,705.71	£38,068.48	£30,788.46	£36,689.87	£32,426.21	£24,810.24	£24,034.32	£6,159.83
Drag Finish Cost (£)	£2,326.80	£3,120.58	£4,224.80	£6,877.65	£4,562.38	£3,942.15	£5,597.08	£4,576.04	£5,009.08	£5,280.75	£5,107.72	£4,219.54	£6,084.65	£4,792.48	£4,177.66	£4,718.41	£3,816.08	£4,547.54	£4,019.08	£3,075.11	£2,978.94	£763.48
Saving (£)	£16,446.00	£22,056.48	£29,861.24	£48,611.78	£32,247.24	£27,863.43	£39,560.56	£32,343.80	£35,404.58	£37,324.71	£36,101.77	£29,824.02	£43,006.78	£33,873.64	£29,528.05	£33,350.07	£26,972.37	£32,142.33	£28,407.13	£21,735.13	£21,055.38	£5,396.34

£284,395.12

£373,321.39

£5,396.34

*Does not include energy costs

Drag Finishing Cost Analysis-Returns

Total Investment £131,552.30

Project Timescale 22 Months

WACC 0.75% (monthly)

***Payback Period 4 ½ Months**

***NPV £176,333.28**

***Rate of Return 18.38%**

Profitability Index 2.34

Benefit Cost Ratio 1.34

Engineering Use

Depreciation £ 5,978.29

Average Investment £ 65,761.15

Average Profit £ 24,163.62

ARR 36.74%

Total Cashflow £ 663,122.00

Net Income/Profit £ 531,599.70

***Corporate standard measurements**

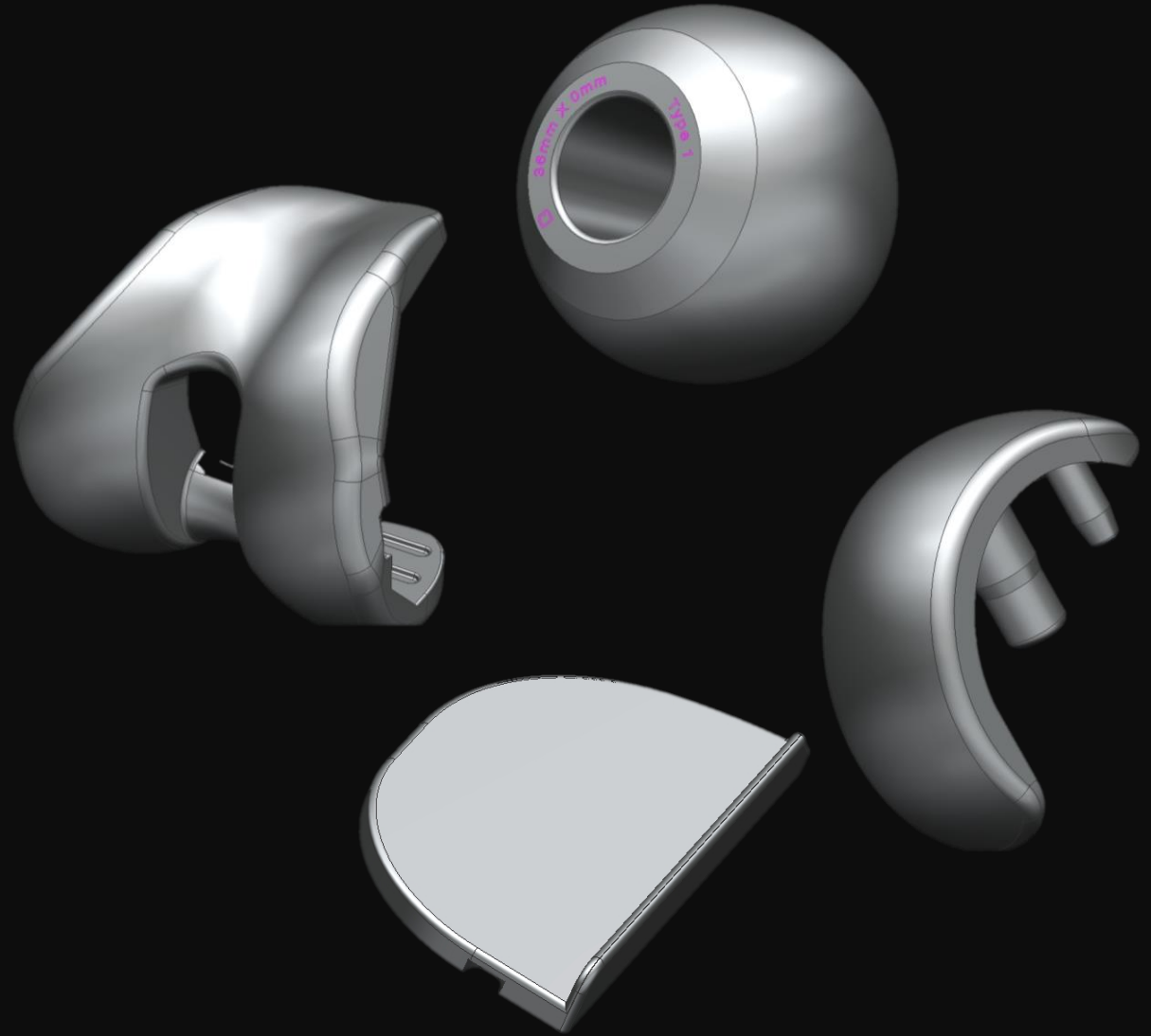
Summary

- Can Meet upcoming demand spike
- Increased finishing capacity
 - Able to process demand ahead of schedule
- Reduced manufacturing costs
- Eliminated the need for increased manning
- Eliminated the need for highly skilled polishers
- High rate of return on investment

The equipment should still be fully operational and serviceable after the build with only 22 months (about 2 years) of use

Drag Finishing- 2025 and Beyond

- Roll out drag finishing to other products
- Develop an automated drag finishing cell
- Release highly skilled operators to tackle products that can only be manually polished



Any
Questions?