

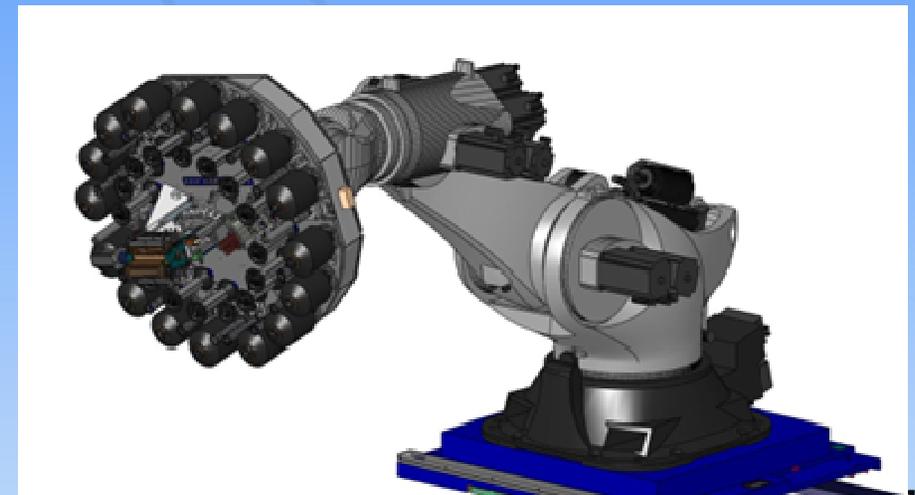
AFP KINEMATICS FOR HIGH SPEED LAYUP

ELECTROIMPACT

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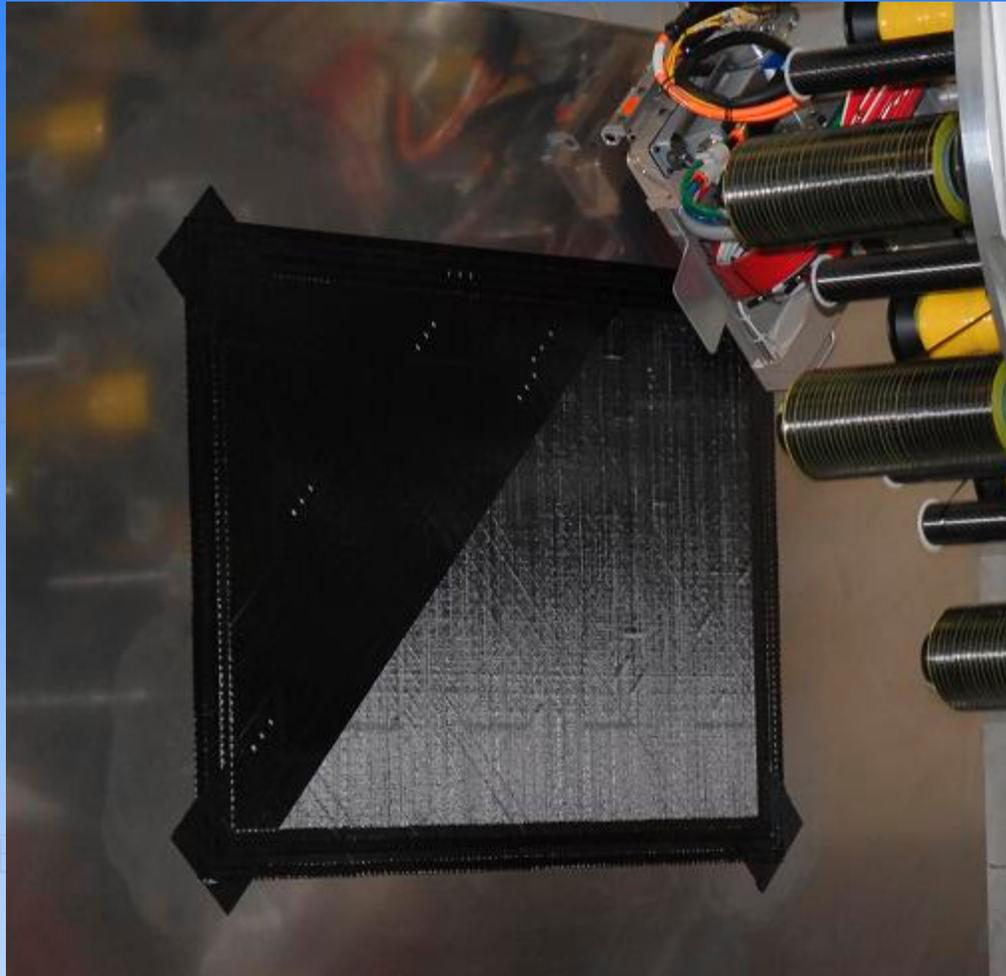


IMAGES AND TECHNOLOGY SHOWN ARE PROPRIETARY TO ELECTROIMPACT



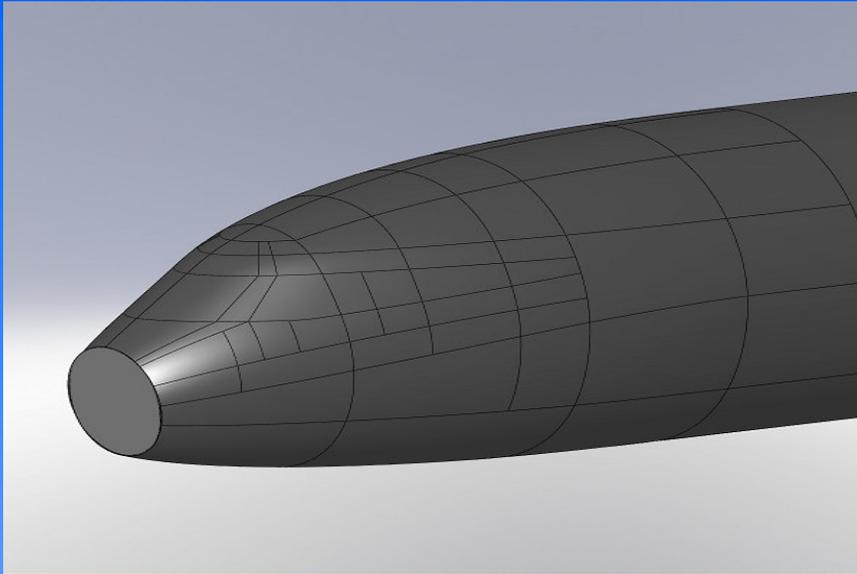
FLAT PLATES

- LOW STRESS ON MACHINE COMPONENTS
- SIMPLE MACHINE KINEMATICS
- MINIMAL ROTARY AXIS MOTION
- GREAT FOR TESTING



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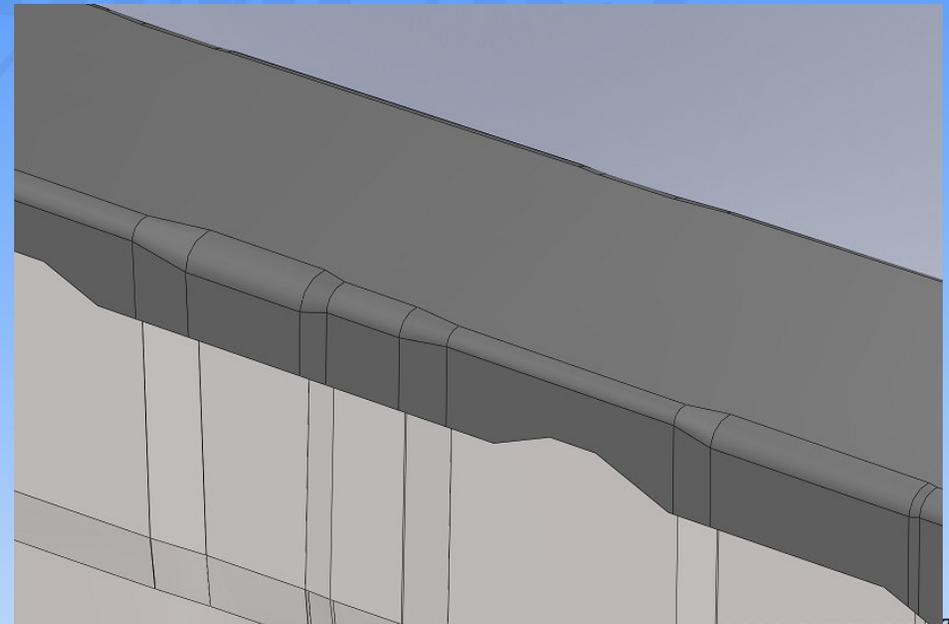




HIGHLY CONTOURED



LOCAL SURFACE CHANGES

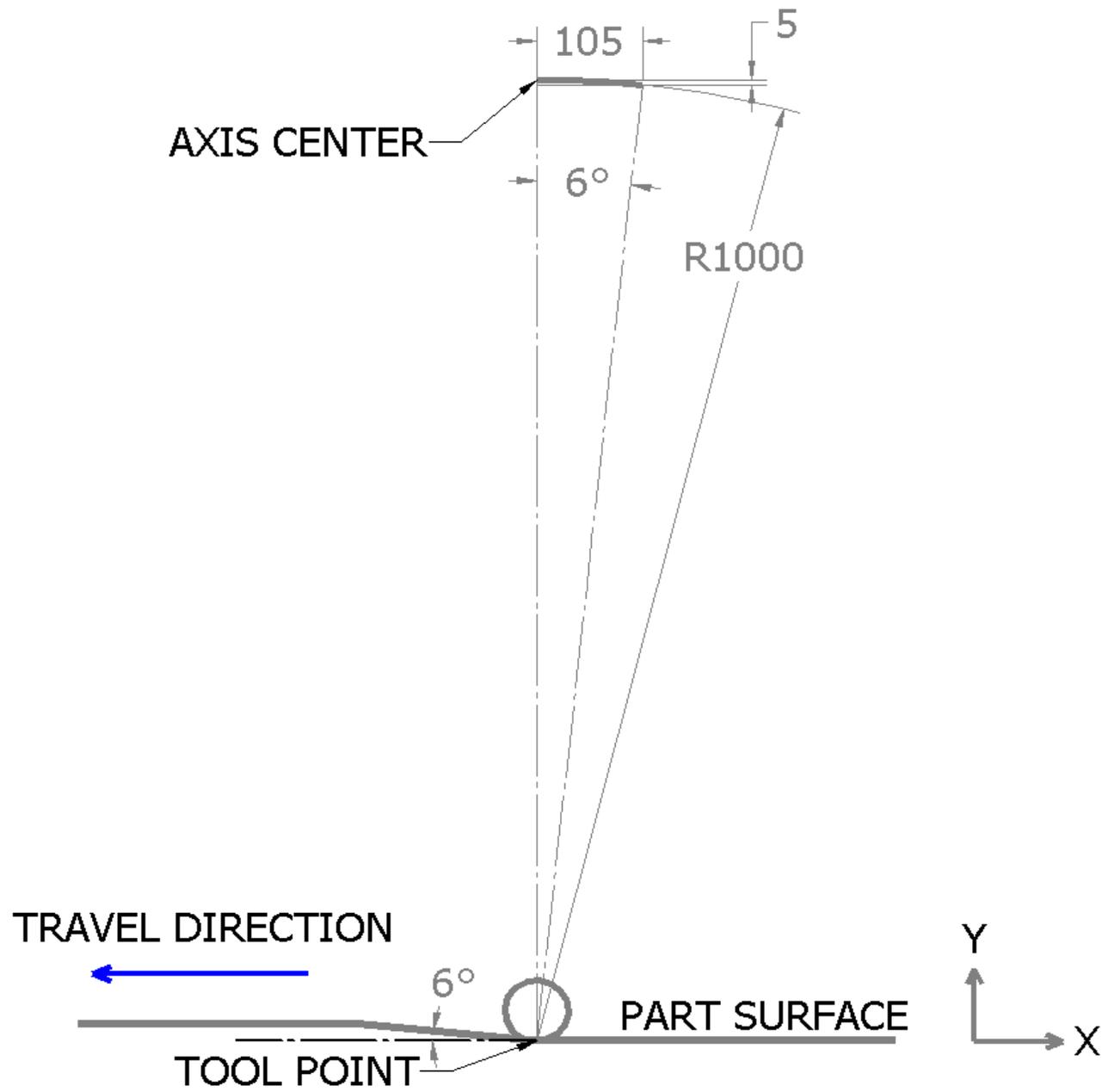


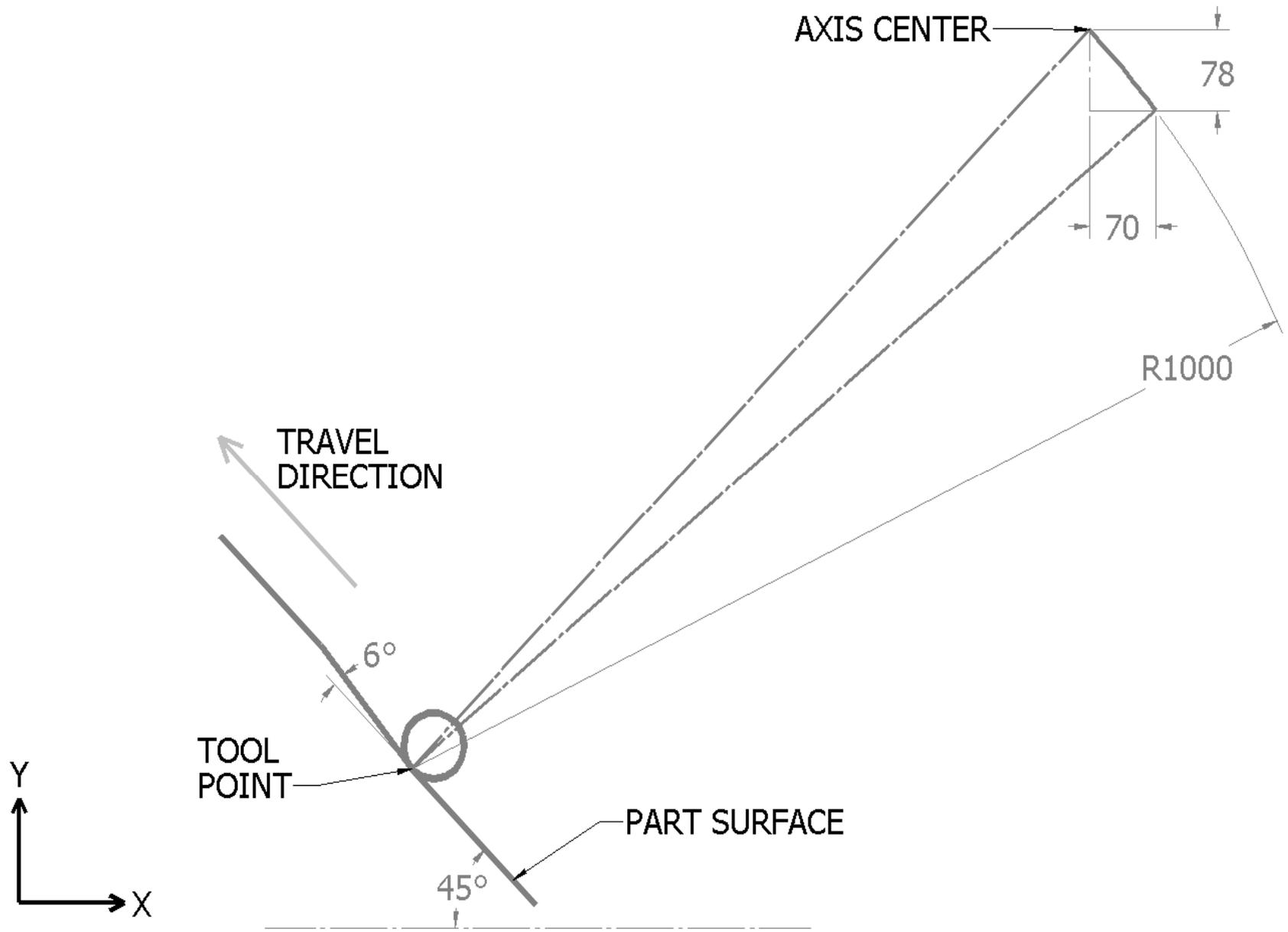
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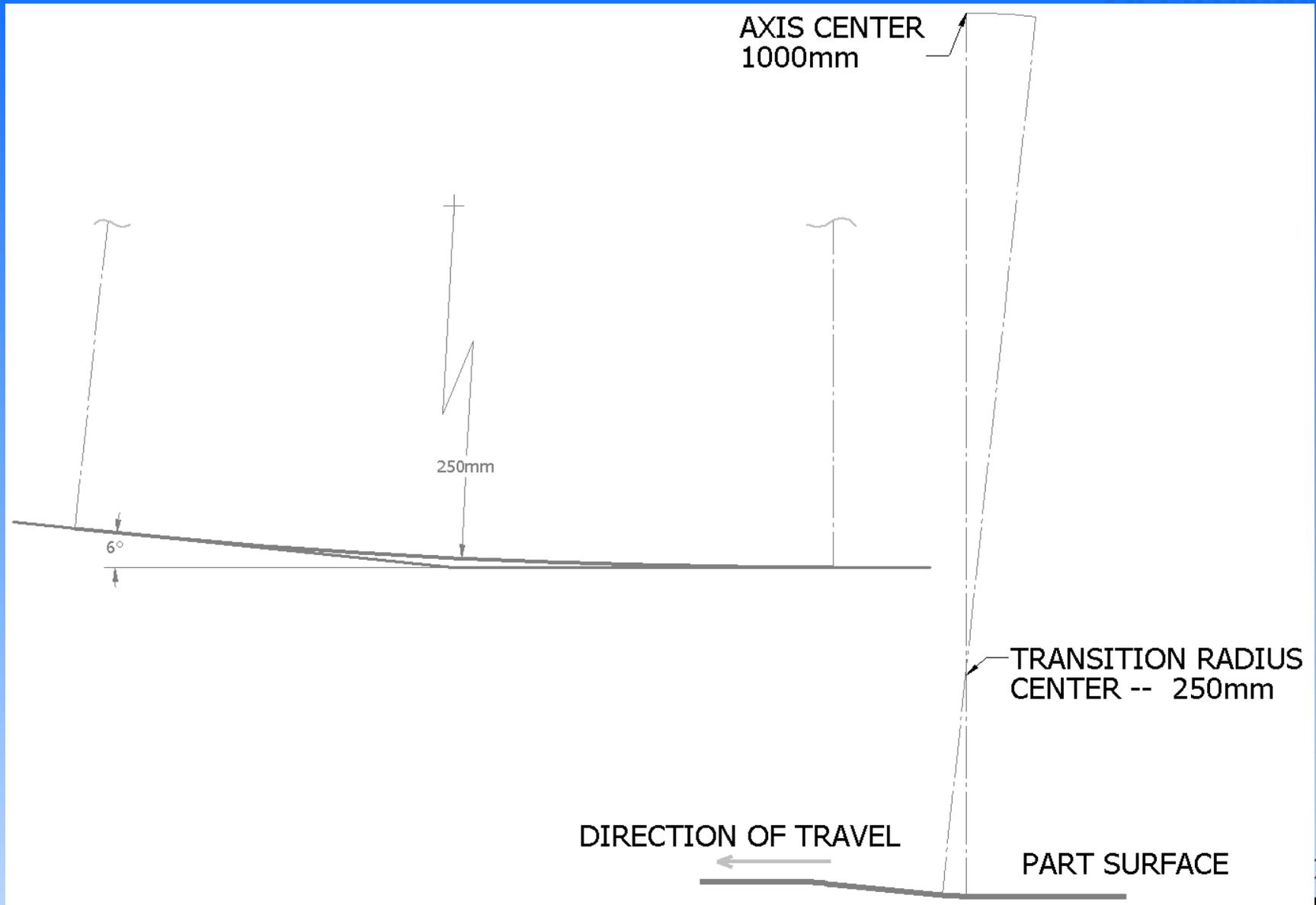
EFFECT ROTARY AXES ARRANGEMENT ON:

- MACHINE KINEMATICS
- MACHINE LIFE
- MACHINE COST
- OVERALL LAY-DOWN RATES





REAL PARTS HAVE TRANSITION RADII



MACHINE KINEMATICS

- MORE DIFFICULT TO CONTROL MACHINE
- INCREASE AXES ACC/DEC REQUIREMENTS

MACHINE LIFE

-  LINEAR TRAVEL   COMPONENT LIFE
e.g. BEARING CARS
BALLSCREWS
RACK/PINIONS...

-  MAINTENANCE

MACHINE COST

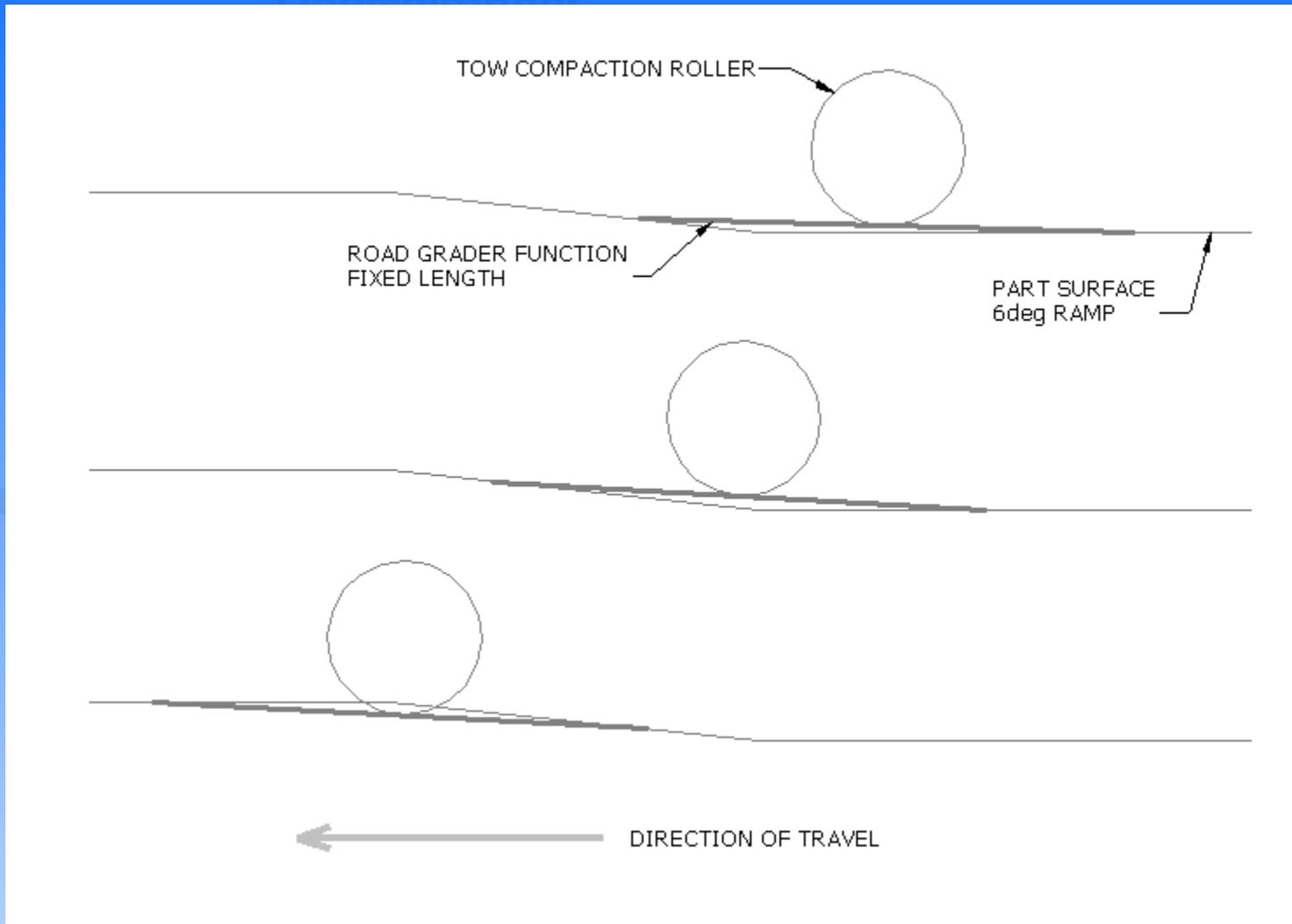
- ↓ COMP. LIFE
- ↑ MAINTENANCE
- ↑ ACC/DEC → LARGER DRIVE COMPONENTS
- ↑ LOADS → ↑ SECTION AND MATERIAL → ↑
- ALL THE ABOVE → ↑ COST

LAY-DOWN RATE

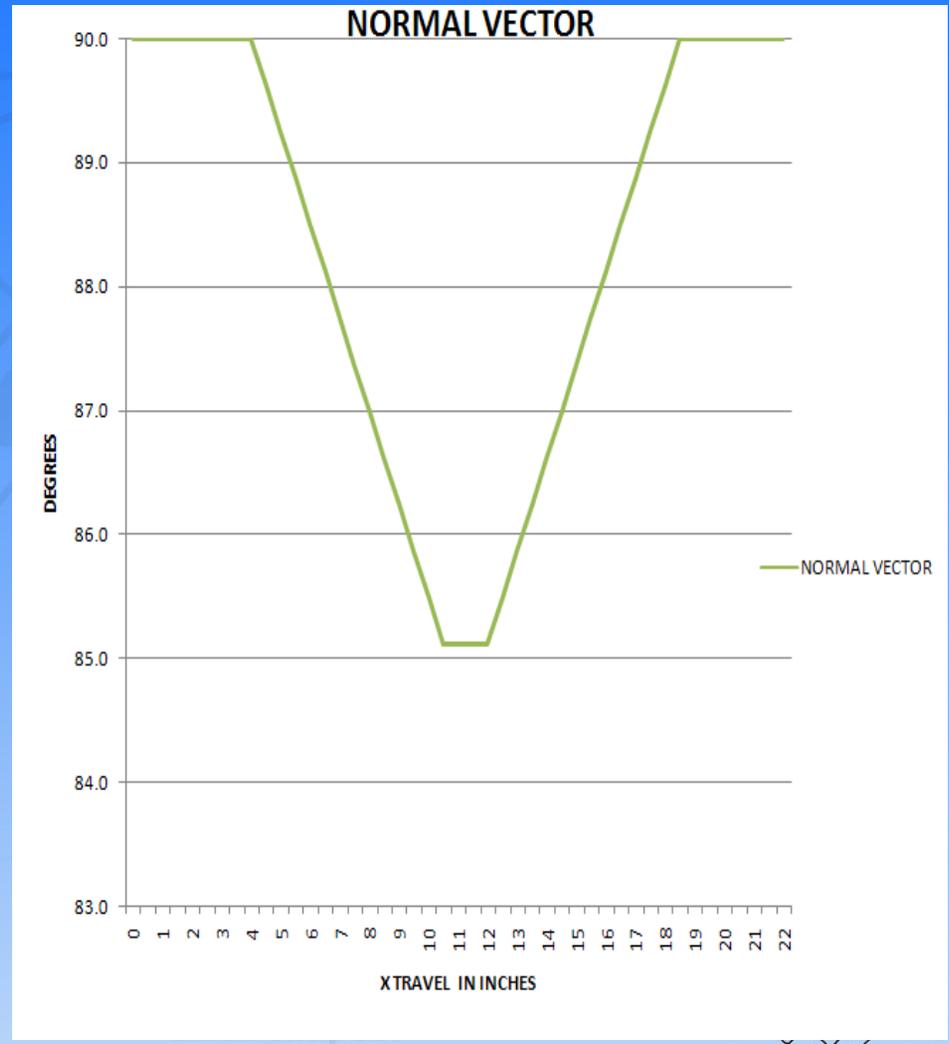
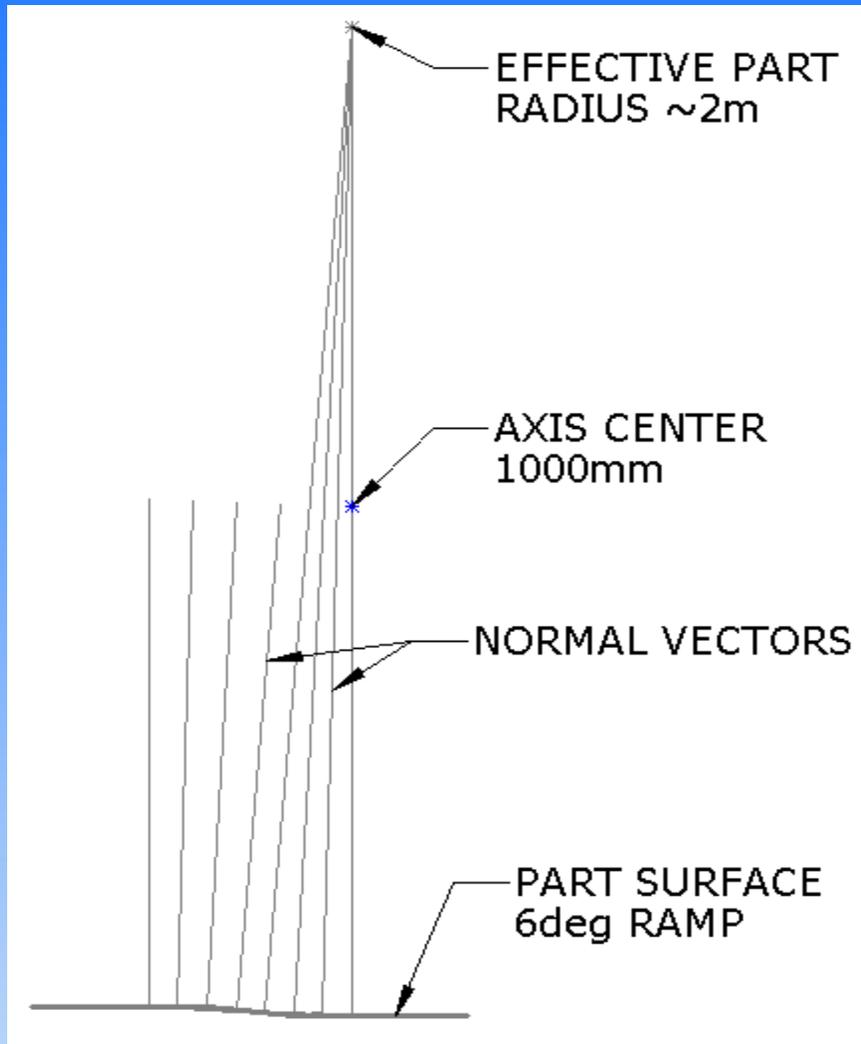
- POOR MACHINE KINEMATICS LEADS TO:

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REDUCED LAY-DOWN RATE

PART SMOOTHING



PART SMOOTHING NORMAL VECTORS

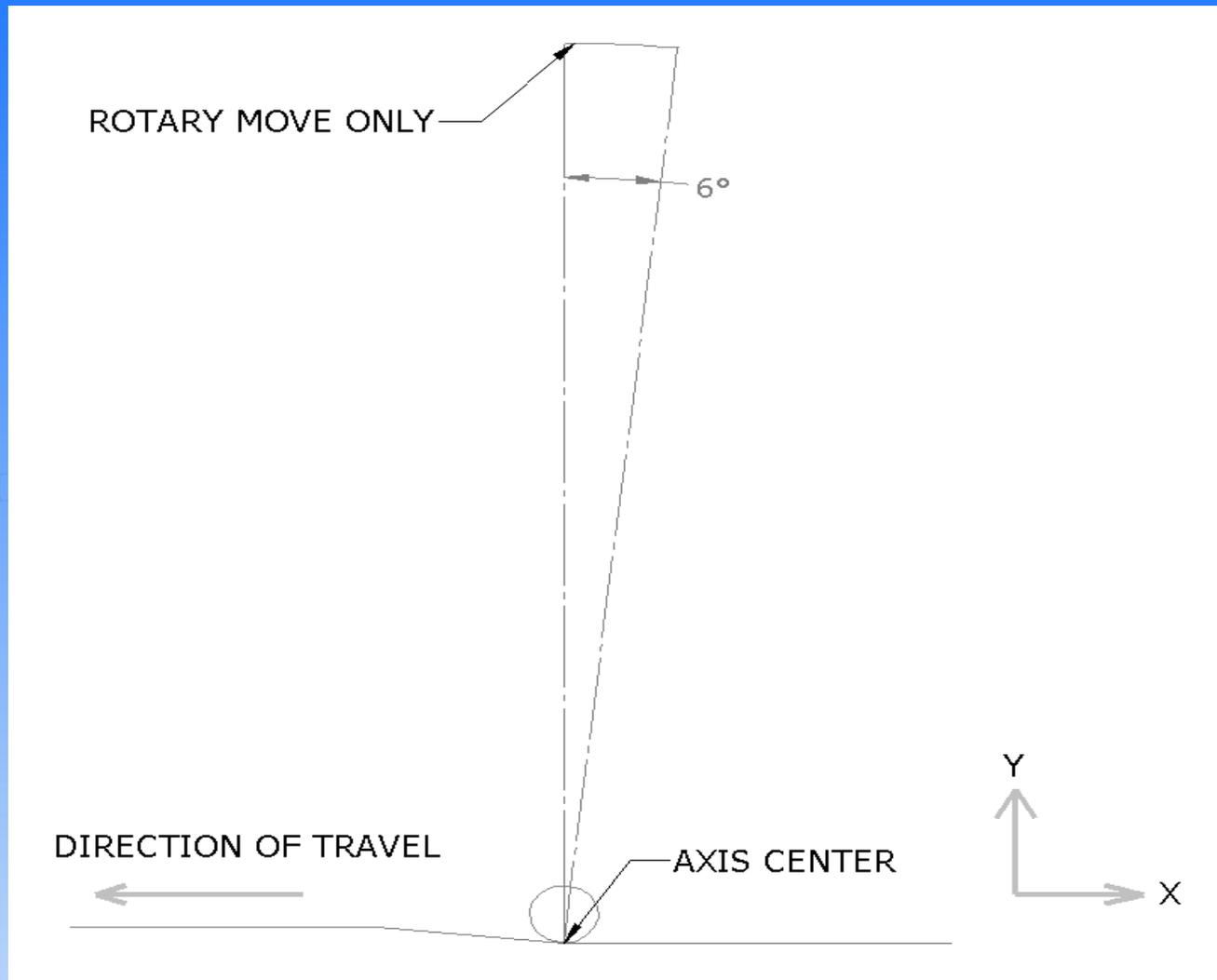


ROAD GRADER

- PROS:
- SMOOTHER MACHINE KINEMATICS
- HIGHER LAY-DOWN RATE

- CONS:
- TOOL PATH DOES NOT FOLLOW PART SURFACE
- NO LONGER NORMAL TO SURFACE
- CAN LEAD TO POOR COMPACTION IN TROUGHS

AXIS ABOUT TOOL POINT



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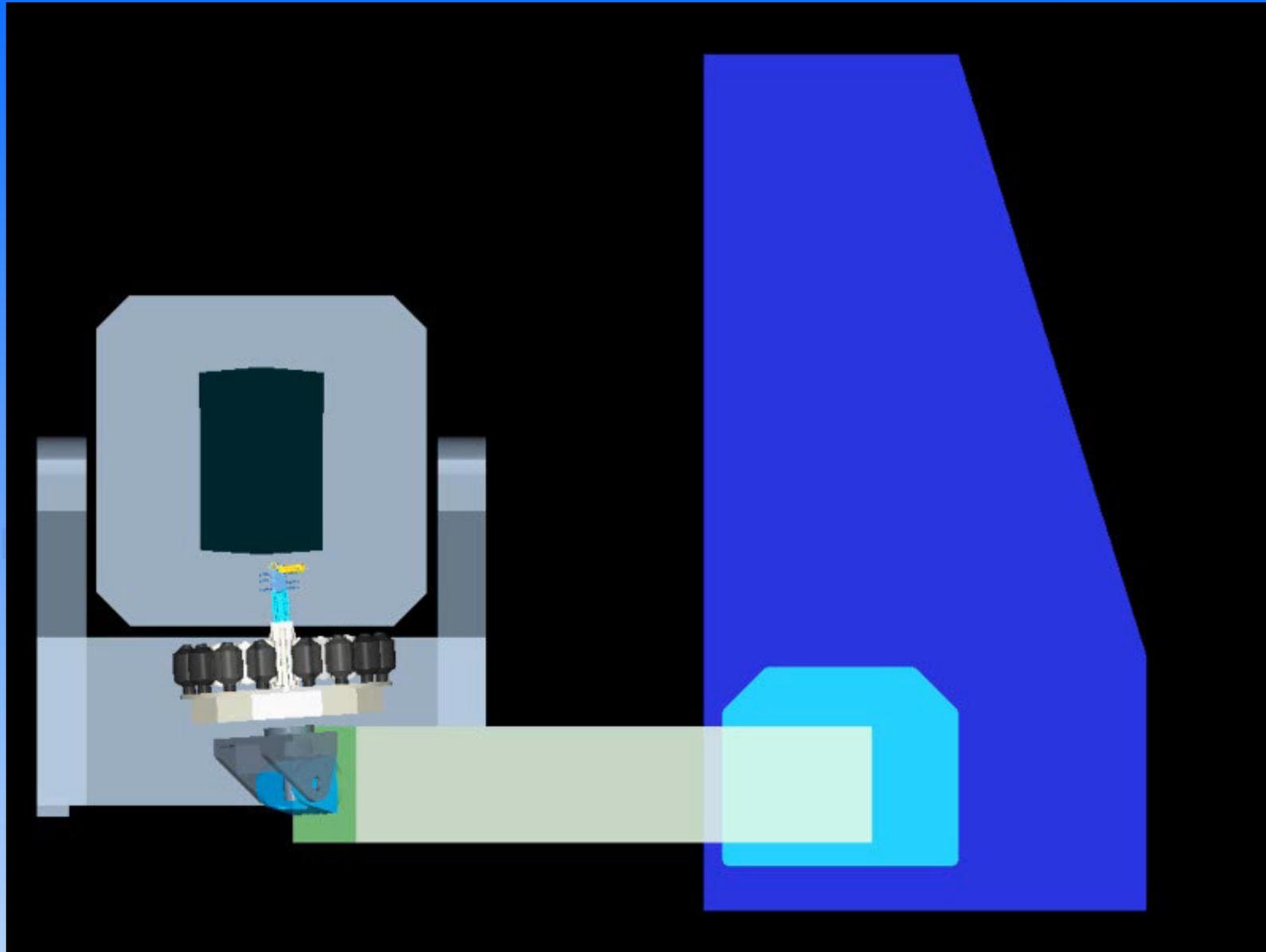


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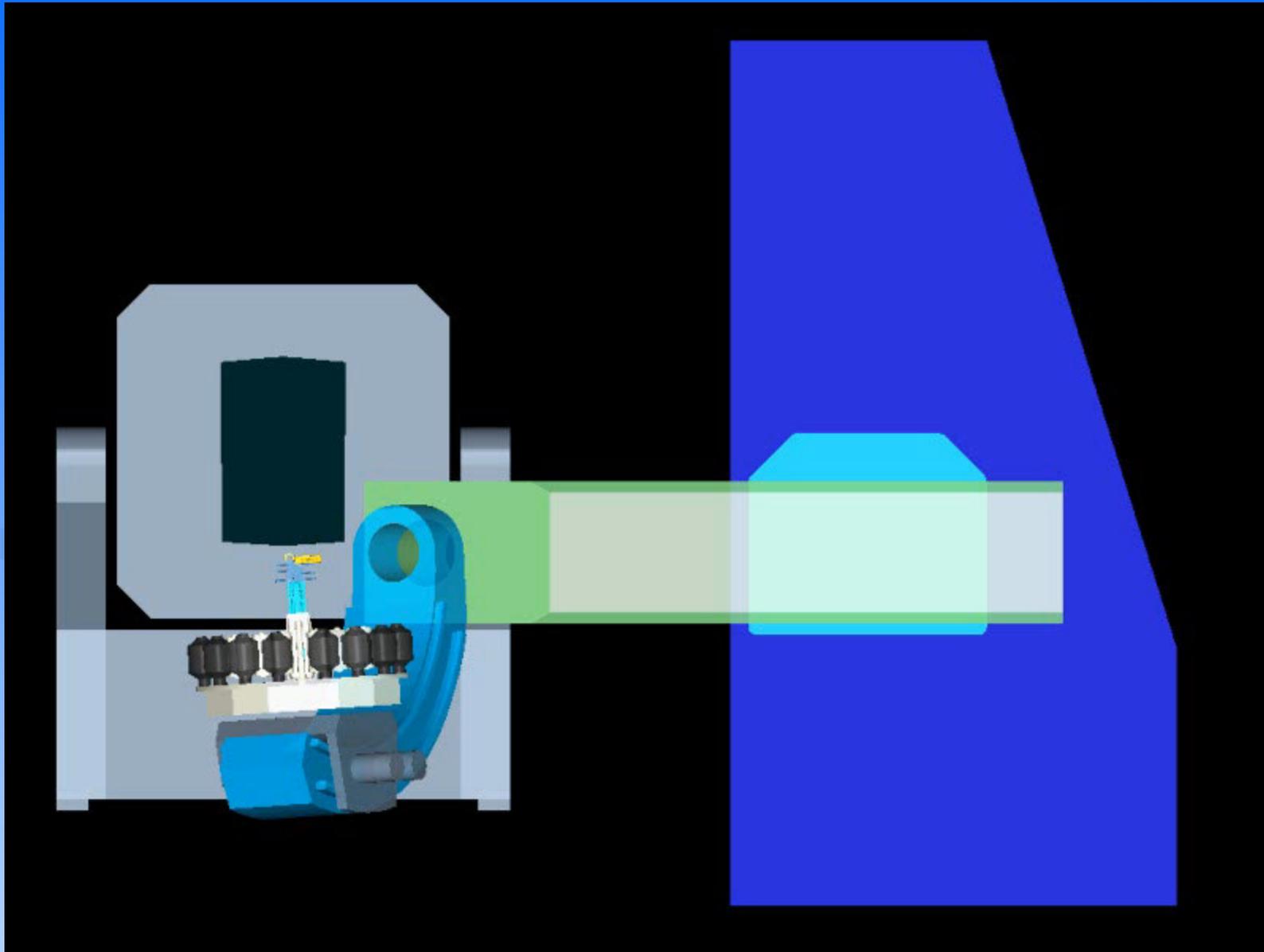
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GOAL: AXIS ABOUT TOOL POINT

- MAJOR AXES -- PART SURFACE
- ROTARY AXES -- NORMALITY AND STEERING
- IMPROVED MACHINE KINEMATICS
- IMPROVED MACHINE CONTROLLABILITY
- DECREASED MACHINE WEAR AND TEAR
- INCREASED LAY-DOWN RATES