Troubleshooting

Drilling

Difficulties	Root causes
Tapered drill holes	-Incorrectly sharpened drill bits -Insufficient play / clearance -Excessively high feed rate
Burnt or melted surface	-Use of unsuitable drill bits -Incorrectly sharpened drill bits -Insufficient feed rate -Blunt drill bit -Land too thick
Surface flaking	-Excessive feed rate -Excessive play / clearance -Excessive incline (thin land as described)
Chatter marks	-Excessive play / clearance -Insufficient feed rate -Drill overhang too great -Excessive incline (thin land as described)
Feed marks or spiral lines at the inside diameter	-Excessively high feed rate -Drill not centred -Drill tip not in centre
Overdimensioned drill holes	-Drill tip not in centre -Land too thick -Insufficient play / clearance -Excessively high feed rate -Drill point angle too great
Underdimensioned drill holes	-Blunt drill bit -Excessive play / clearance -Drill point angle too small

Difficulties	Root causes
Unconcentric drill holes	-Excessively high feed rate -Spindle speed too low -Drill penetrates too far into next part -Parting-off tool leaves "stump" which deflects the drill bit -Land too thick -Drilling speed too high at the start -Drill not clamped centrally -Drill not correctly sharpened
Burr left after parting off	-Blunt cutting tool -Drill does not travel completely through the part
Drill quickly becomes blunt	-Feed rate too low -Spindle speed too low -Insufficient lubrication due to cooling

Turning and milling

Difficulties	Root causes
Surface has started to melt	-Blunt tool or shoulder friction -Insufficient lateral play / clearance -Feed rate too low -Spindle speed too high
Rough surface	-Feed rate too high -Incorrect clearance -Sharp point at the tool (slight spur radius required) -Tool not centrally mounted
Burr on corners of cutting edge	-No space in front of the cutting diameter -Blunt tool -Insufficient lateral play / clearance -No lead angle at the tool
Cracks or flaking at the corners	-Too much positive inclination at the tool -Tool approaches material with too much force (impact too high) -Blunt tool -Tool mounted under the centre

Difficulties	Root causes
	-Sharp point at the tool (slight spur radius required)
Chatter marks	-Excessive spur radius at the tool -Tool not sufficiently firmly mounted -Insufficient material guidance -Cutting edge width too great (use 2 cuts)

Parting off/sawing

Difficulties	Root causes
Surface has started to melt	-Blunt tool -Insufficient lateral play / clearance -Insufficient coolant feed
Rough surface	-Feed rate too high -Tool unprofessionally sharpened -Cutting edge not honed
Spiral marks	-Tool friction during withdrawal -Burr on the tool
Concave and convex surfaces	-Point angle too great -Tool not vertical relative to the spindle -Tool is deflected -Feed rate too high -Too mounted above or below the centre
"Stumps" or burr at the end of the cutting surface	-Point angle not large enough -Blunt tool -Feed rate too high
Burr on the outside diameter	-Blunt tool -No space in front of the cutting diameter