

FUNDAMENTAL MANUFACTURING PROCESSES

Turning & The Lathe

SCENE 1.

TU58A, CGS: Turning Operations
white text, centered on background
FMP01B, motion background

SCENE 2.

TU59A, **FTD016**, **16:10:24:00-16:11:02:00**
zoom out, turning operation
TU59B, CGS, ROLL: Straight Turning
Taper Turning
Contour Turning
Forming
Chamfering
Grooving
Thread Chasing
Facing
Holemaking
Reaming
Boring
Tapping
Parting Off
Picking Off

NARRATION (VO) :

EXTERNAL AND INTERNAL TURNING OPERATIONS
CAN BE BROKEN DOWN INTO A NUMBER OF BASIC
CUTS. THE PRIMARY TYPES INCLUDE:
STRAIGHT TURNING,
TAPER TURNING,
CONTOUR TURNING,
FORMING,
CHAMFERING,
GROOVING,
THREAD CHASING,
FACING,
HOLEMAKING,
REAMING,
BORING,
TAPPING,
PARTING OFF,
AND PICKING OFF.

--- TOUCH BLACK ---

SCENE 3.

TU60A, CGS: Straight Turning
TU60B, **FTD012**, **11:11:17:00-11:11:38:00**
zoom out, chipbreaking turning operation
TU60C, **FTD012**, **11:23:34:00-11:24:06:00**
carbide finish turning operation

NARRATION (VO) :

IN STRAIGHT TURNING, THE TOOL IS FED
PARALLEL TO THE AXIS OF THE WORK TO REDUCE

ITS DIAMETER SO THAT THE FINAL DIAMETER IS THE SAME AT EACH END. REMOVING A SIGNIFICANT AMOUNT OF MATERIAL IN ONE PASS IS CALLED ROUGH TURNING; THE FINAL, LIGHTER CUT THAT CREATES A SMOOTH SURFACE FINISH IS CALLED FINISH TURNING.

SCENE 4.

TU61A, CGS: Taper Turning
TU61B, **FMP014**, **14:23:18:00-14:23:37:00**
taper turning operation

NARRATION (VO) :

TAPER TURNING PRODUCES A TAPER ALONG THE AXIS OF THE WORKPIECE. TAPERS ARE PRODUCED BY OFFSETTING THE TAILSTOCK FROM CENTERLINE OR BY USING A TAPER ATTACHMENT. SHORT, STEEP TAPERS CAN BE TURNED USING A COMPOUND REST.

SCENE 5.

TU62A, CGS: Contour Turning
TU62B, **FTD021**, **01:03:25:00-01:03:50:00**
zoom out, contouring

NARRATION (VO) :

CONTOUR TURNING, OR PROFILING, WAS FORMERLY PERFORMED BY HAVING THE SINGLE-POINT CUTTING TOOL TRACE A TEMPLATE OF THE DESIRED PROFILE SHAPE. THIS HAS LARGELY BEEN REPLACED BY 'CNC' TURNING, IN WHICH THE DESIRED CONTOUR IS SIMPLY PROGRAMMED INTO THE MACHINE, WHICH DIRECTS A CUTTING TOOL TO CUT THE CONTOUR.

SCENE 6.

TU63A, CGS: Forming
TU63B, **FTD017**, **17:21:20:00-17:21:35:00**
zoom in, forming tool on multi-spindle automatic
TU63C, **FMP005**, **05:30:20:00-05:30:54:00**
zoom in, multi-spindle automatic

NARRATION (VO) :

FORMING IS ANOTHER ALTERNATIVE FOR GENERATING COMPLICATED SHAPES. THE TOOL HAVING THE DESIRED FORM OR GEOMETRY IS ADVANCED PERPENDICULAR TO THE AXIS OF

ROTATION, REPRODUCING THE TOOL SHAPE IN THE WORKPIECE. FORMING IS COMMONLY PERFORMED ON AUTOMATIC SCREW MACHINES.

SCENE 7.

TU64A, CGS: Chamfering
TU64B, **FMP013**, **13:19:10:00-13:19:23:00**
chamfering of workpiece

NARRATION (VO) :

CHAMFERING ELIMINATES SHARP CORNERS FROM A WORKPIECE, AND IS A GOOD SAFETY MEASURE. TYPICALLY CHAMFERING BREAKS CORNERS AT A 45 DEGREE ANGLE.

SCENE 8.

TU65A, CGS: Grooving
TU65B, **FTD021**, **01:02:43:00-01:03:04:00**
plunge grooving operation
TU65C, **FTD007**, **06:20:44:00-06:21:06:00**
grooving operation, tool widening groove

NARRATION (VO) :

GROOVING CREATES A GROOVE OR RECESS USING A TOOL THAT IS USUALLY THE SIZE AND SHAPE OF THE REQUIRED GROOVE. SOME GROOVING TOOLS CAN ALSO WIDEN A GROOVE BY TRAVERSING SIDE TO SIDE AFTER PLUNGING INTO THE WORKPIECE.

SCENE 9.

TU66A, CGS: Thread Chasing
TU66B, **SME2537**, **01:19:08:00-01:19:19:00**
thread chasing operation

NARRATION (VO) :

THREAD CHASING MAKES REPEATEDLY DEEPER CUTS IN THE SAME HELICAL GROOVE, USING A TOOL WITH THE DESIRED THREAD FORM.

SCENE 10.

TU67A, CGS: Facing
TU67B, **SME3984**, **11:05:51:00-11:06:21:00**
facing operation

NARRATION (VO) :

FACING SQUARES UP THE END OF A WORKPIECE. IT ALSO FINISHES THE WORK, OR A SINGLE DIAMETER, TO THE DESIRED LENGTH.

SCENE 11.

TU68A, CGS: Holemaking
TU68B, **SME3453**, **21:22:09:00-21:22:31:00**
holemaking operation on plastic part
TU68C, **SME2537**, **01:18:48:00-01:19:00:00**
stationary drill advanced into work
TU68D, **SME2506**, **01:04:20:00-01:04:42:00**
stationary drill advanced into work

NARRATION (VO) :

HOLEMAKING OPERATIONS ON A LATHE ARE USUALLY PERFORMED WORKING FROM THE END OF THE PART. ON A LATHE, THIS IS MOST

COMMONLY DONE BY ADVANCING A NON-ROTATING
DRILL INTO THE END OF A ROTATING
WORKPIECE.

SCENE 12.

TU69A, SME3453, 21:25:43:00-21:25:59:00
cross holes being drilled in plastic part
TU69B, SME2538, 02:29:49:00-02:30:20:00
cross holes being drilled

NARRATION (VO) :

CROSS-HOLES AND ANGLED HOLES ARE PRODUCED
BY HOLDING THE WORKPIECE IN A FIXED
POSITION AND ADVANCING A ROTATING DRILL
INTO THE WORK. IN SOME CASES BOTH WORK AND
DRILL ROTATE. MULTI-AXIS LATHES MAY ALSO
ALLOW A HOLE TO BE DRILLED OFF-CENTER OR
AT AN ODD ANGLE TO THE 'Z' AXIS.

SCENE 13.

TU70A, FMP013, 13:16:58:00-13:17:14:00
drill advanced into workpiece

NARRATION (VO) :

BECAUSE DRILLING PRODUCES A FAIRLY ROUGH
HOLE SURFACE OF LIMITED DIMENSIONAL
ACCURACY, IT MAY BE FOLLOWED BY A HOLE
FINISHING OPERATION.

SCENE 14.

TU71A, CGS: Reaming
TU71B, FMP013, 13:18:03:00-13:18:20:00
reaming of drilled hole

NARRATION (VO) :

REAMING ENLARGES AND FINISHES A PREVIOUSLY
DRILLED HOLE BY REMOVING A SMALL AMOUNT OF
MATERIAL WITH A FLUTED TOOL OF THE FINAL
HOLE DIAMETER.

SCENE 15.

TU72A, CGS: Boring
TU72B, FTD004, 04:07:23:00-04:07:49:00
zoom out, boring operation on lathe

NARRATION (VO) :

BORING ENLARGES AND FINISHES A HOLE WITH A
SINGLE POINT CUTTING TOOL. THE BORING BAR
MOVES ALONG THE AXIS OF THE PART, AS IN
TURNING, BUT INSIDE A DRILLED HOLE.

SCENE 16.

TU73A, CGS: Tapping

NARRATION (VO) :

TU73B, SME2631, 01:19:00:00-01:19:17:00
zoom in, tapping on the lathe

TAPPING CUTS THREADS INSIDE A PREVIOUSLY
DRILLED HOLE USING A TAP, WHICH COMBINES
BOTH ROTARY AND AXIAL CUTTING MOTIONS.

SCENE 17.

TU74A, CGS: Parting Off

TU74B, FMP007, 07:13:20:00-07:13:35:00
parting off operation

NARRATION (VO):

PARTING OFF, OR CUTTING OFF, IS SIMILAR TO
GROOVING, EXCEPT THAT THE NARROW TOOL
ADVANCES ALL THE WAY TO THE WORKPIECE'S
CENTER, CAUSING THE FINISHED PART TO FALL
OFF.

SCENE 18.

TU75A, CGS: Picking Off

TU75B, FMP012, 12:30:25:00-12:31:17:00
picking off of part, edit at multiple
points

NARRATION (VO):

WITH PICKING-OFF, THE PART IS GRABBED
BEFORE IT IS CUT OFF...,
ONCE CUT-OFF IS COMPLETE, THE PART IS
TRANSFERRED TO ANOTHER LOCATION, SUCH AS A
SECOND SPINDLE.

--- FADE TO BLACK ---