

**FUNDAMENTAL MANUFACTURING PROCESSES**

Turning & The Lathe

SCENE 1.

**TU06A, FTD022, 02:18:04:00-02:18:14:00**  
work being turned

**NARRATION (VO) :**

TURNING ON THE LATHE IS ONE OF THE OLDEST,  
AND MOST COMMON METALCUTTING OPERATIONS.

SCENE 2.

**TU07A, FTD021, 01:05:55:00-01:07:31:00**  
turning operation, edit at multiple  
points  
**TU07B, FTD004, 04:14:26:00-04:14:38:00**  
zoom out, boring of turned part

**NARRATION (VO) :**

IN TURNING, A WORKPIECE IS ROTATED ABOUT  
ITS LONGITUDINAL AXIS, WHILE SINGLE-POINT  
CUTTING TOOLS ARE FED INTO THE WORKPIECE,  
SHEARING OFF UNWANTED MATERIAL AS IT  
TURNS. THIS CREATES A PART OF DESIRED  
DIMENSIONS AND SHAPE THAT IS SYMMETRICAL  
AROUND ITS TURNING AXIS. TURNING CAN ALSO  
BE PERFORMED ON THE EXPOSED END OF THE  
PART AND ITS INTERNAL SURFACES.

SCENE 3.

**TU08A, FMP016, 17:02:53:00-17:03:10:00**  
wide, zoom in, vertical turning operation  
**TU08B, SME2650, 01:05:24:00-01:05:45:00**  
turning long part

**NARRATION (VO) :**

TURNING IS PERFORMED ON THE LATHE, ONE OF  
THE MOST VERSATILE OF ALL MACHINE TOOLS  
FOR SHAPING MATERIALS. LATHES ARE  
PARTICULARLY SUITED TO MACHINING  
RELATIVELY LONG, CYLINDRICAL WORKPIECES,  
YET CAN CREATE A VARIETY OF PARTS.

SCENE 4.

**TU09A, SME2520, 04:01:28:00-04:01:44:00**  
zoom out, watch works  
**TU09B, zoom out, propeller shaft**  
**TU09C, SME3453, 21:24:56:00-21:26:40:00**  
zoom in, turning operation using multiple  
cutting on plastic parts, edit at  
multiple points

**NARRATION (VO) :**

THE SIZE OF TURNED PARTS VARIES WIDELY  
FROM SMALL WATCH COMPONENTS...,  
TO MASSIVE PROPELLER SHAFTS.

HIGH-VOLUME PARTS ARE MADE USING AUTOMATED COMPUTER NUMERICAL CONTROL, OR 'CNC' LATHES. THESE SYSTEMS TYPICALLY HAVE MULTIPLE CUTTING TOOLS THAT ARE APPLIED AUTOMATICALLY AGAINST THE WORKPIECE, ACCORDING TO THE PART'S PROGRAMMED MACHINING REQUIREMENTS.

SCENE 5.

**TU10A, FMP002, 02:01:53:00-02:02:23:00**

zoom out, turning operation

**TU10B, SME3519, 14:28:45:00-14:29:02:00**

zoom out, gear hobbing of blanks

**NARRATION (VO) :**

TURNING CAN PRODUCE HIGHLY ACCURATE PARTS, THOUGH IT MAY ALSO BE USED AS AN INTERMEDIATE PROCESS FOR MAKING A PART, RATHER THAN THE FINAL PROCESS. FOR EXAMPLE, GEAR BLANKS REQUIRE TURNING BEFORE THE GEAR TEETH ARE CUT.

SCENE 6.

**TU11A, FTD012, 11:05:12:00-11:05:32:00**

zoom in, turning operation

**TU11B**, still, lathe chuck, arrows, lines appear

**TU11C**, CGS: Swing

**TU11D**, still, lathe chuck and tailstock, arrows, lines appear

**TU11E**, CGS: Distance Between Centers

**NARRATION (VO) :**

THE KIND OF PART THAT CAN BE TURNED ON A LATHE IS DETERMINED BY THE WORKPIECE'S INITIAL DIMENSIONS AND THE LATHE'S DIMENSIONS. TWO IMPORTANT MEASURES OF A LATHE'S WORK CAPACITY ARE THE MAXIMUM DIAMETER WORK THE LATHE CAN TURN, OR 'SWING' . . . , AND THE MAXIMUM LENGTH OF WORK THE LATHE CAN HOLD, OR THE 'DISTANCE BETWEEN CENTERS' .

SCENE 7.

**TU12A, SME3447, 15:15:53:00-15:16:17:00**

zoom in, turning operation on a plastic part with a lot of chips

**TU12B**, micrography, continuous soft steel

**NARRATION (VO) :**

TURNING ON A LATHE IS EFFECTIVE FOR

turning

**TU12C**, micrography, discontinuous cast  
iron turning

**TU12D**, **SME2650**, **01:12:11:00-01:12:33:00**  
cast iron turning

CUTTING A VARIETY OF MATERIALS, RANGING  
FROM SOFT PLASTICS TO HARD STEELS.  
WORKPIECE MATERIAL IS REMOVED AS CHIPS  
THAT FORM AS THE TOOL MAKES CONTINUOUS  
CONTACT WITH THE PART. A 'CONTINUOUS' CHIP  
IS FORMED WHEN TURNING DUCTILE MATERIALS,  
SUCH AS SOFT STEELS OR ALUMINUM.  
'DISCONTINUOUS' CHIPS ARE FORMED WHEN THE  
MATERIAL IS NOT DUCTILE ENOUGH TO DEFORM  
CONTINUOUSLY, BUT INSTEAD FRACTURES AHEAD  
OF THE CUTTING TOOL. DISCONTINUOUS CHIPS  
ARE COMMONLY FORMED WHEN MACHINING BRITTLE  
MATERIALS SUCH AS CAST IRON.

--- FADE TO BLACK ---