FUNDAMENTAL MANUFACTURING PROCESSES

Turning & The Lathe

SCENE 1.
TU31A, CGS: Lathe Types
white text, centered on background
FMP01B, motion background

SCENE 2.
TU32A, FMP002, 02:55:54:00-02:56:05:00
pan, large turning operation

NARRATION (VO):

TURNING PARTS PRODUCTIVELY REQUIRES USING THE RIGHT MACHINE FOR THE JOB.

SCENE 3.
TU33A, SME2519, 02:21:20:00-02:21:56:00
engine lathe, turning work

NARRATION (VO):

THE ENGINE LATHE IS USED LARGELY FOR SINGLE, PROTOTYPE, AND LOW-QUANTITY PARTS, RATHER THAN HIGH-VOLUME PRODUCTION.

SCENE 4.
TU34A, FMP016, 17:19:08:00-17:19:23:00
zoom out, vertical turret lathe operator at controls
TU34B, FMP016, 17:17:35:00-17:17:48:00
vertical turret lathe operation

NARRATION (VO):

COMPUTER NUMERICAL CONTROL OR 'CNC' LATHES OFFER THE PRODUCTIVITY AND FLEXIBILITY THAT ARE NEEDED FOR PRECISION MACHINING AND LARGE PRODUCTION RUNS. THEY ARE TODAY'S MAIN PRODUCTION LATHES AND COME IN MANY DESIGNS, OFFERING MANY CUTTING OPERATIONS.

SCENE 5.
TU35A, SME3983, 10:12:35:00-10:12:55:00
zoom out, contour turning operation
TU35B, FMP016, 16:04:57:00-16:05:14:00
operator at machine controls
TU35C, FTD021, 01:09:20:00-01:10:25:00
turning operation, edit at multiple points

NARRATION (VO):

'CNC' LATHES CAN CREATE TAPERS, ARCS, CONTOURS, OR OTHER PART FEATURES THAT WOULD BE DIFFICULT OR IMPOSSIBLE TO CREATE ON A MANUAL LATHE. THESE MOTIONS ARE DEFINED MATHEMATICALLY, THEN PROGRAMMED

AND STORED AS TOOL PATHS IN THE MACHINE'S COMPUTER MEMORY. A PROGRAMMED PATH INCLUDES MACHINE SLIDE MOTIONS AND CUTTING TOOL MOTIONS, COMBINING BOTH LINEAR AND ROTARY MOTIONS PRECISELY.

SCENE 6.
TU36A, FTD101, 11:36:05:00-11:36:22:00
zoom out, turning operation
TU36B, FTD101, 11:32:30:00-11:32:49:00
operator performing hardness test
TU36C, SME3983, 10:23:51:00-10:24:06:00
zoom in, turning operation

NARRATION (VO):

'CNC' LATHES CAN RUN THROUGH ONE OR MORE PART PROGRAMS COMPLETELY UNATTENDED, LEAVING THE MACHINIST FREE TO PERFORM OTHER TASKS. WORKPIECES PRODUCED BY 'CNC' PROGRAMS WILL BE ACCURATE AND IDENTICAL, EXCEPT FOR PROCESS VARIATIONS CAUSED BY TOOL WEAR AND MATERIAL INCONSISTENCIES.

SCENE 7.
TU37A, FTD101, 11:44:52:00-11:45:25:00
zoom out, 2 axis single turret turning

NARRATION (VO):

THE TWO-AXIS, SINGLE-TURRET 'CNC' LATHE IS THE SIMPLEST KIND OF 'CNC' TURNING MACHINE. HERE, ALL CUTTING TOOLS ARE HELD IN ONE TURRET, WHICH IS ON A SLIDE THAT MOVES IN TWO AXIS DIRECTIONS, PERFORMING ONE CUTTING OPERATION AT A TIME.

SCENE 8.
TU38A, FMP016, 16:05:53:00-16:06:10:00
two-turret, four-axis cnc lathe, part checked and operation starting, edit at multiple points

NARRATION (VO):

THE TWO-TURRET, FOUR-AXIS 'CNC' LATHE ALLOWS TOOLS FROM SEPARATE TURRETS, EACH ON ITS OWN SLIDE, TO CUT SIMULTANEOUSLY. THIS REDUCES CYCLE TIME.

SCENE 9.
TU39A, FMP009, 09:17:02:00-09:17:28:00
advanced cnc lathe using two-turrets and sub-spindle

NARRATION (VO):

FOR GREATER PRODUCTIVITY, THESE KINDS OF

MULTI-TASKING CAPABILITIES ARE BUILT INTO ADVANCED 'CNC' LATHES. SUCH MACHINES USE SUB-SPINDLES AND C-AXIS AND Y-AXIS MOTIONS TO PERFORM MULTIPLE METALCUTTING OPERATIONS IN A SINGLE MACHINE SETUP. THUS, SEVERAL SINGLE-POINT TOOLS ARE BROUGHT TO THE WORKPIECE IN ONE MACHINE CYCLE, IMPROVING PRODUCTIVITY.

SCENE 10.
TU40A, FMP004, 04:32:20:00-04:32:42:00
zoom in, turning then milling on lathe
TU40B, FMP009, 09:42:27:00-09:42:40:00
zoom in, milling on lathe

NARRATION (VO):

FOR EXAMPLE, TURN-MILL LATHES HAVE BOTH MILLING AND TURNING CAPABILITIES. FOR MILLING, THE WORKPIECE IS HELD FIXED OR ROTATED SLOWLY, WHILE ROTATING OR 'LIVE' TOOLS ARE BROUGHT TO IT. THE MAIN BENEFIT OF THE TURN-MILL LATHE IS THAT MORE COMPLEX WORKPIECES CAN BE FINISHED ON A SINGLE MACHINE.

SCENE 11.
TU41A, FMP009, 09:32:37:00-09:33:14:00
wide, lathe with sub-spindle, edit at multiple points

NARRATION (VO):

'CNC' LATHES HAVING A SECONDARY SUB-SPINDLE ACCEPT PARTIALLY FINISHED WORK FROM THE MAIN SPINDLE. THEN ANOTHER WORKPIECE IS FED TO THE FIRST SPINDLE, AND BOTH SPINDLES ARE RUN SIMULTANEOUSLY.

SCENE 12.
TU42A, FMP007, 07:32:43:00-07:32:53:00
pan of twin-opposed spindle machine
TU42B, FMP007, 07:35:30:00-07:35:54:00
twin-opposed spindle machine handing off part between spindles

NARRATION (VO):

THE TWIN-OPPOSED SPINDLE MACHINE, SIMILAR TO THE SUB-SPINDLE LATHE, HAS TWO SPINDLES OF EQUAL POWER. SUB-SPINDLE AND OPPOSED-

SPINDLE LATHES TYPICALLY ARE USED TO COMPLETE A WORKPIECE ON BOTH ENDS, ELIMINATING SECONDARY OPERATIONS.

SCENE 13.
TU43A, FTD032, 12:39:44:00-12:40:03:00
zoom out, single spindle screw machine

NARRATION (VO):

AUTOMATIC SCREW MACHINES ARE FOR HIGH-PRODUCTION TURNING AND UNATTENDED OPERATION. CUTS ON THE END OF THE WORK ARE COMBINED WITH CUTS FROM THE SIDE FOR RAPID PRODUCTION. THERE ARE SINGLE-SPINDLE AND MULTI-SPINDLE TYPES.

SCENE 14.
TU44A, FMP005, 05:25:20:00-05:25:54:00
zoom out, multi-spindle automatic

NARRATION (VO):

THE MULTI-SPINDLE AUTOMATIC IS THE PREMIER HIGH-PRODUCTION TURNING MACHINE. IT CAN MACHINE MULTIPLE PARTS SIMULTANEOUSLY. IN SOME DESIGNS, SIX OR EIGHT SPINDLES ARE HELD IN A ROTATING SPINDLE DRUM. DURING PROCESSING, THIS DRUM ROTATES THE SPINDLES AND POSITIONS EACH WORKPIECE WITH THE REQUIRED CUTTING TOOL.

SCENE 15.
TU45A, SME3453, 21:12:05:00-21:13:02:00
swiss machine used for machining plastic part

NARRATION (VO):

THE SWISS-TYPE ‘CNC’ LATHE MAKES PARTS THAT ARE LONG AND THIN. STOCK IS FED LONGITUDINALLY BY A SLIDING HEADSTOCK THROUGH A BUSHING, WHERE IT IS CUT BY RADIALLY-ARRANGED TURNING TOOLS. THUS, LONG, THIN PARTS CAN BE TURNED WITHOUT DEFLECTION, BECAUSE ALL TURNING IS DONE

ADJACENT TO THE BUSHING THAT SUPPORTS THE ROTATING BARSTOCK.

SCENE 16.
TU46A, FMP016, 17:15:44:00-17:16:04:00
zoom out, vertical turret lathe operation
TU46B, FMP016, 17:12:54:00-17:13:22:00
zoom in, vertical turret lathe operation

NARRATION (VO):

VERTICAL TURRET LATHES, OR VTL'S, ARE COMMONLY USED FOR LARGE DIAMETER ROUND PARTS NOT SUITABLE FOR HOLDING IN THE CHUCK OF A HORIZONTAL LATHE. THE WORKPIECE IS CLAMPED SECURELY ONTO A TABLE AND ROTATED. TOOLS IN TOOLBLOCKS OR TURRETS ARE THEN FED FROM ABOVE, OR FROM THE SIDE, INTO THE ROTATING WORK. LIKE HORIZONTAL LATHES, VTL'S CAN BE FITTED WITH MULTIPLE 'LIVE' SPINDLES FOR MILLING, DRILLING, OR ADDITIONAL OPERATIONS.

--- FADE TO BLACK ---