

FUNDAMENTAL MANUFACTURING PROCESSES

Sheet Metal Stamping Dies & Processes-SD

SCENE 1.

SD73A, CGS: Stamping Analysis
white text, centered on background
FMP BKG, motion background

SCENE 2.

SD74A, SME4003, 02:02:20:00-02:02:27:00
technician working on die
SD74B, SME4426, 14:07:51:00-14:07:58:00
technicians building die
SD74C, SME4003, 02:14:21:00-14:14:52:00
technician working on die

NARRATION (VO) :

DIE MAKING IS AS MUCH AN ART AS IT IS A
SCIENCE, AND REQUIRES A GREAT DEAL OF
EXPERIENCE AND EXPERTISE TO CONSTRUCT A
DIE THAT WILL MANUFACTURE AN ACCEPTABLE
PART.

SCENE 3.

continue previous shot
SD75A, CGS: Metal Flow
Friction at the Tool/Workpiece
Interface
Behavior Properties of the
Stamped Material
SD75B, SME4137, 08:31:30:00-08:31:55:00
part being stamped

NARRATION (VO) :

FACTORS SUCH AS:
METAL FLOW,
FRICTION AT THE TOOL/WORKPIECE
INTERFACE,
AND THE BEHAVIOR PROPERTIES OF THE
STAMPED MATERIAL MAKE IT DIFFICULT TO
PREDICT THE FINAL SHAPE THAT A DIE WILL
PRODUCE.

SCENE 4.

SD76A, SME2765, 02:28:04:00-02:28:22:00
technicians looking at formed part with
circle grid
SD76B, CGS: Circle Grid Analysis/CGA

NARRATION (VO) :

ONE ANALYTICAL TOOL USED BY DIE MAKERS
TO HELP ASSURE SHEET METAL PART DESIGN
FORMABILITY IS CALLED CIRCLE GRID
ANALYSIS, OR 'CGA'. THIS TECHNIQUE
PERMITS MEASURING THE TYPE AND SEVERITY
OF DEFORMATION THAT OCCURS AT VARIOUS

POINTS ON A STAMPED PART.

SCENE 5.

SD77A, SME2765, 02:12:26:00-02:12:42:00
grid etched into sheet metal stock
SD77B, SME2765, 02:18:32:00-02:18:41:00
stock stamped
SD77C, SME2765, 02:19:14:00-02:19:23:00
c.u. deformed grid

NARRATION (VO) :

FIRST A GRID, CONSISTING OF A PATTERN OF SMALL CIRCLES IS ETCHED ON THE SURFACE OF THE BLANK PRIOR TO FORMING. THIS GRID DEFORMS WITH THE BLANK ALLOWING POINT-TO-POINT CALCULATIONS OF THE DEFORMATION THAT OCCURRED DURING THE STAMPING OPERATION.

SCENE 6.

SD78A, SME2765, 02:24:28:00-02:24:44:00
c.u. deformed grid of part being inspected

NARRATION (VO) :

ANALYZING THE STAMPED GRID PATTERN SUGGESTS THE LOCATION AND TYPE OF REWORK THAT MUST BE PERFORMED ON THE DIES TO PRODUCE EASILY MANUFACTURED PARTS.

SCENE 7.

SD79A, SME2765, 02:13:53:00-02:14:05:00
pull back, stock being etched
SD79B, SME2766, 03:01:16:00-03:01:26:00
c.u. deformed grid
SD79C, SME2765, 02:15:24:00-02:15:29:00
stock being etched

NARRATION (VO) :

ONCE CHANGES ARE MADE, THE CIRCLE GRID ANALYSIS PROCESS BEGINS AGAIN. BY OBSERVING THE RESULTING CHANGES IN METAL DEFORMATION, THE TOOLROOM TECHNICIANS CAN IDENTIFY THE CORRECTIONS NEEDED FOR FOLLOWING TRYOUTS. THIS PROCESS CONTINUES UNTIL AN ACCEPTABLE PART IS MADE.

SCENE 8.

SD80A, SME4002, 01:43:12:00-01:43:28:00
computer screen with formed part,
indication of parts formability
SD80B, SME4427, 15:55:04:00-15:55:37:00
computer screen with sheet metal cycling
through drawing operation forces
SD80C, SME4427, 15:55:56:00-15:56:00:00
long still of final formed part

NARRATION (VO) :

COMPUTER SOFTWARE PROGRAMS ARE AVAILABLE THAT CAN ASSURE THAT PROPOSED STAMPING DESIGNS CAN BE MANUFACTURED WITH

SD80D, SME4140, 08:12:18:00-08:12:36:00
computer screen with finite element
modeling being used to prove out formed
part

SD80E, SME4002, 01:45:02:00-01:45:19:00
computer screen with formed part,
indication of parts formability

CERTAINTY, WITH THE OBJECTIVE OF
MINIMIZING THE LENGTHY FINE-TUNING
PROCESS OF DIE MAKING. ANALYTICAL TOOLS
SUCH AS FINITE ELEMENT MODELING, OR FEM,
ARE ALSO USED ESPECIALLY FOR
FACILITATING DEEP DRAW PROGRESSIVE
DESIGN WITH MINIMUM TRIAL AND ERROR
SITUATIONS.

--- FADE TO BLACK ---