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FUNDAMENTAL MANUFACTURING PROCESSES

Sheet Metal Stamping Presses - SP

SCENE 1.
FMP01A, CGS: FBI warning
text centered on black to transparent gradient
FMP BKG, motion background

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SCENE 2.
continue motion background
FMP02A, CGS: DRL screen
text centered on black to transparent gradient

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SCENE 3.
continue motion background
FMP03A, CGS: disclaimer
white text, centered on background

Always read the operating manual and safety information provided by the manufacturer before operating any manufacturing equipment.
Make sure all machine guards are in place, and follow all safety procedures when working with or near manufacturing equipment.

SCENE 4.
FMP SME, SME logo open, with music

SCENE 5.
FMP05A, FMP open, with music
SP05B, edited peter carey narration

MUSIC UP AND UNDER

NARRATION (VO):

THE FUNDAMENTAL MANUFACTURING PROCESSES VIDEO SERIES, EXAMINING THE TOOLS AND TECHNIQUES OF PRECISION MANUFACTURING.

SCENE 6.
continue FMP open
SP06A, CGS: Sheet Metal Stamping Presses

NARRATION (VO):

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white text, centered on background
FMP06B, blue background
FMP06C, sound slug

THIS PROGRAM EXPLORES STAMPING PRESSES AND THEIR USE IN FORMING PARTS FROM SHEET METAL.

SCENE 7.
SP07A, SME4423, 13:39:39:00-13:39:56:00
metal forming operation
SP07B, SME4427, 15:50:35:00-15:50:55:00
zoom out, milling contoured surface

NARRATION (VO):

METAL WORKING MACHINE TOOLS CAN GENERALLY BE CLASSIFIED AS PERFORMING EITHER METALFORMING...,
OR METALCUTTING OPERATIONS.

SCENE 8.
SP08A, SME4130, 01:05:55:00-01:06:55:00
turning operation
SP08B, SME2503, 02:21:05:00-02:21:47:00
zoom out, metalcutting on knee mill
SP08C, SME4427, 15:50:50:00–15:51:10:00
zoom in, metalcutting on machining center
SP08D, still, chips

NARRATION (VO):

METALCUTTING MACHINE TOOLS, SUCH AS LATHES...,
MILLS...,
AND MACHINING CENTERS, REMOVE UNWANTED METAL, LEAVING ONLY THE DESIRED FINISHED WORKPIECE, AS WELL AS SCRAP IN THE FORM OF CHIPS.

SCENE 9.
SP09A, SME2694, 02:22:18:00-02:22:34:00
forming operation with little scrap

NARRATION (VO):

IN METALFORMING OPERATIONS, THE PART IS SHAPED BY TOOLING IMPACTING ON THE METAL STOCK, OFTEN ACHIEVING THE FINAL SHAPE WITH LITTLE OR NO SCRAP.

SCENE 10.

NARRATION (VO):

SHEET METAL STAMPING TRANSFORMS METAL INTO FUNCTIONAL PRODUCTS BY APPLYING THE FORCE OF A MOVING RAM TO TOOLING LOCATED WITHIN THE STAMPING PRESS.

SCENE 11.
SP11A, SME4423, 13:13:36:00- 13:14:00:000

NARRATION (VO):

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zoom in, sheet metal stock to die impact, to finished part

STAMPING'S PRIMARY ADVANTAGE IS THE ABILITY TO TRANSFORM TWO-DIMENSIONAL SHEET METAL STOCK INTO THREE-DIMENSIONAL FINISHED COMPONENTS AT A RELATIVELY HIGH RATE OF SPEED WITH MINIMUM OPERATOR INTERVENTION.

SCENE 12.
SP12A, SME4428, 16:27:30:00-16:27:44:00
simple formed part
SP12B, SME2765, 02:19:38:00-02:19:42:00
complex formed part
SP12C, SME2757, 01:21:48:00-01:22:00:00
active automotive stamping
SP12D, SME2766, 03:06:57:00-03:07:02:00
automotive stamping
SP12E, SME2695, 03:27:03:00-03:27:07:00
automotive door stampings
SP12F, SME4423, 13:45:06:00-13:45:35:00
stamping of part
SP12G, SME4423, 13:49:47:00-13:49:54:00
stamped parts

NARRATION (VO):

SHEET METAL STAMPINGS RANGE FROM SIMPLE STAMPED PARTS...,
TO COMPLEX CURVED SHAPES. COMMON EXAMPLES OF STAMPED SHEET METAL PARTS ARE FOUND IN AUTOMOBILE MANUFACTURING. THE STAMPING PRESS TRANSFORMS STEEL INTO NUMEROUS FRAME AND BODY COMPONENTS. VARIOUS PRODUCTS IN OTHER INDUSTRIES ARE ALSO FABRICATED LARGELY FROM STAMPED SHEET METAL COMPONENTS.

SCENE 13.
SP13A, SME2693, 01:12:14:00-01:12:23:00
press operating
SP13B, SME2693, 01:23:03:00-01:23:16:00
c.u. die impacted
SP13C, SME2761, 04:10:04:00-04:10:17:00
die set taken apart
SP13D, SME2765, 02:03:44:00-02:03:47:00
large die set
SP13E, SME2695, 03:18:05:00-03:18:12:00
entire press tooling
SP13F, CGS: Punch
SP13G, CGS: Die

NARRATION (VO):

IT IS ESSENTIAL TO UNDERSTAND THAT THE STAMPING PRESS SIMPLY PROVIDES THE FORCE FOR THE STAMPING OPERATION; THE FINISHED STAMPING IS DETERMINED BY TOOLING WITHIN THE DIE, WHICH IS LOCATED WITHIN THE PRESS. PRESS TOOLING MOST COMMONLY CONSISTS OF A DIE SET. THE MALE COMPONENT IS CALLED THE PUNCH, WHILE THE FEMALE COMPONENT IS REFERRED TO AS THE DIE.

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SCENE 14.
SP14A, SME4428, 16:14:58:00–16:14:10:00
mechanical press operating
SP14B, SME4423, 13:11:42:00–13:11:50:00
hydraulic press operating
SP14C, SME4423, 13:30:20:00–13:30:36:00
pan down press to stamping operation
SP14D, SME4423, 13:27:11:00–13:27:37:00
wide, press operating

NARRATION (VO):

PRESSES USE EITHER MECHANICAL...,

OR HYDRAULIC POWER TO FORCE THE TOOLING

TOGETHER AND FORM THE PART. THE PRESS

TONNAGE REQUIRED TO COMPLETE A PART OR

PARTICULAR OPERATION IS DETERMINED BY

COMBINATION OF CALCULATIONS WHICH

INCLUDE A LINEAL MEASURE OF THE

OPERATION TO BE DONE, MATERIAL TENSILE

STRENGTH AND PART COMPLEXITY.

--- FADE TO BLACK ---

SCENE 15.
SP15A, CGS: Mechanical Presses
white text, centered on background
FMP BKG, motion background

SCENE 16.
SP16A, SME4003, 02:12:03:00-02:12:15:00
large mechanical press
SP16B, SME2766, 05:02:43:00-05:02:50:00
bench top mechanical press

multiple, tandem line press

NARRATION (VO):

MECHANICAL SHEET METAL STAMPING PRESSES

VARY WIDELY IN SIZE. BENCH TOP PRESSES

ARE AMONG THE SMALLEST, AND ARE RATED AS

LOW AS FIVE TONS CAPACITY. EXTREMELY

LARGE, MULTIPLE OR TANDEM PRESS LINES,

RATED IN THOUSANDS OF TONS, ARE USED FOR

STAMPING VERY LARGE, COMPLICATED

WORKPIECES.

SCENE 17.
, SME2764, 01:07:42:00-01:07:55:00
slow press stroke speed
very fast press stroke feed

very fast press stroke feed

NARRATION (VO):

PRESS STROKE SPEEDS CAN VARY FROM 8 OR

10 STROKES PER MINUTE...,

TO OPERATING SPEEDS OF UP TO 1800

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STROKES PER MINUTE. HIGH SPEED STAMPING OPERATIONS REQUIRE DIE SET PROTECTION SYSTEMS INCORPORATING SENSORS AND CAMERAS TO MONITOR PUNCH AND DIE ALIGNMENT AND THE FORCE GENERATED AS THE DIE SET CLOSES.

SCENE 18.
, SME2693, 01:02:16:00-01:02:40:00
tilt of mechanical gap-frame press
, CGS: Gap-Frame Press

mechanical straightside press
, CGS: Straightside Press

NARRATION (VO):

BOTH MECHANICAL AND HYDRAULIC PRESSES ARE COMMONLY CLASSIFIED BY THE DESIGN OF THE FRAME THAT SUPPORTS THE MOVING ELEMENTS OF THE PRESS. THE TWO PREDOMINANT PRESS CONFIGURATIONS ARE THE GAP-FRAME, SOMETIMES CALLED THE 'C' FRAME...,

AND THE STRAIGHTSIDE PRESS.

SCENE 19.
SP19A, SME4428, 16:33:29:00-16:33:42:00
mechanical gap-frame press, showing 'c' shape.

NARRATION (VO):

THE PRINCIPAL FEATURE OF THE GAP-FRAME CONFIGURATION IS ITS C-SHAPED THROAT OPENING.

SCENE 20.
SP20A, SME4421, 12:09:27:00-12:09:41:00
mechanical gap-frame press
SP20B, SME2693, 01:24:37:00-01:24:45:00
mechanical straightside press
SP20C, SME2693, 01:01:48:00-01:02:12:00
mechanical gap-frame press, operating

NARRATION (VO):

ADVANTAGES OF THE GAP-FRAME PRESS ARE EASE OF ACCESS TO THREE SIDES OF THE DIE AREA, AS WELL AS THE NEED FOR LESS FLOOR SPACE THAN THE STRAIGHTSIDE PRESS. IN PRESS FORCE CAPACITIES RANGING FROM 35 TO 60 TONS, GAP FRAME PRESSES MAY COST APPROXIMATELY HALF AS MUCH AS STRAIGHTSIDE PRESSES.

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SCENE 21.
continue previous shot

ANI: 'c' frame mechanical press experiencing angular deflection
SP021C, SME4421, 12:12:34:10 - 12:12:50:29
robust framed mechanical press, operating

, SME2760, 03:13:10:00-03:13:18:00
'c' frame mechanical press experiencing angular deflection

NARRATION (VO):

THE MAIN DISADVANTAGE OF THE GAP FRAME PRESS IS AN UNAVOIDABLE ANGULAR MISALIGNMENT THAT OCCURS DURING STAMPING OPERATIONS. THIS DEFLECTION OF THE 'C' FRAME CAN ONLY BE LIMITED BY VERY ROBUST FRAME CONSTRUCTION, WHICH ADDS TO THE WEIGHT AND COST OF THE MACHINE. IN MANY APPLICATIONS, HOWEVER, THIS MISALIGNMENT IS NOT A PROBLEM.

SCENE 22.
, SME2760, 03:26:10:00-03:26:23:00
wide, open back inclinable gap frame press, zoom into base
, CGS: Open Back Inclinable
, SME2692, 01:08:18:00-01:08:28:00
wide, open back stationary gap frame press producing parts
, CGS: Open Back Stationary
, SME2755, 01:26:54:00-01:27:06:00
parts blasted away from die with air

NARRATION (VO):

THE FRAME OF THE OPEN BACK INCLINABLE, OR 'OBI' STYLE OF GAP FRAME PRESS, PIVOTS AT THE BASE. THIS FEATURE AIDS IN FINISHED PART OR SCRAP DISCHARGE. GENERALLY HOWEVER, THE OPEN BACK STATIONARY, OR 'OBS' STYLE OF GAP FRAME PRESS IS USED MORE OFTEN, WITH PARTS REMOVED FROM THE DIE BY TIMED BLASTS OF AIR, AUTOMATIC UNLOADING DEVICES, OR CONVEYORS.

--- TOUCH BLACK ---

SCENE 23.
, SME2756, 02:04:22:00-02:04:35:00
mechanical straightside press constructed with prestressed tie rods

NARRATION (VO):

STRAIGHTSIDE PRESSES DERIVE THEIR NAME FROM THE VERTICAL COLUMNS OR UPRIGHTS LOCATED ON EITHER SIDE OF THE MACHINE.

SCENE 24.
continue previous shot,

NARRATION (VO):

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ANI: straightside press constructed with tie rods, dissolve to**(need to find)**

ANI: prestressed tie rods appear on image**(need to find)**

THE HOUSING, OR FRAME, OF MOST STRAIGHTSIDE PRESSES IS HELD TOGETHER IN COMPRESSION BY PRESTRESSED TIE RODS; ALTHOUGH SOME STRAIGHTSIDE PRESSES HAVE SOLID FRAMES.

SCENE 25.
, SME2764, 01:01:36:00-01:01:56:00
mechanical straightside press, operating, zoom into die

NARRATION (VO):

ANGULAR DEFLECTION DURING STAMPING IS NOT AN ISSUE WITH STRAIGHTSIDE PRESSES. FOR THAT REASON, DIMENSIONAL ACCURACY OF STAMPED PARTS AND THE NEED FOR DIE MAINTENANCE OFTEN IMPROVE WITH THE SELECTION OF A STRAIGHTSIDE PRESS.

SCENE 26.
SP026A, SME4428 16:14:09:10 – 16:14:32:00
still, mechanical straightside press

SP026B, SME4428 16:14:55:00 - 16:15:05:00
mechanical straightside press, crown highlighted**(need to find)**
, CGS: Crown
Cont. shot SP026A
mechanical straightside press, columns highlighted**(need to find)**
, CGS: Columns
SP026C, SME4428 16:13:23:00 - 16:13:48:00
mechanical straightside press, bed highlighted**(need to find)**
, CGS: Bed
Cont. shot SP026C
mechanical straightside press, bolster highlighted**(need to find)**
, CGS: Bolster

NARRATION (VO):

THE MAIN STRUCTURAL COMPONENTS OF A STRAIGHTSIDE PRESS INCLUDE THE CROWN...,

THE COLUMNS...,

BED...,

AND BOLSTER.

SCENE 27.
, SME2693, 01:10:07:00-01:10:28:00
mechanical straightside press crown, shot of motor, flywheel, clutch & brake in crown, tilt down of columns

NARRATION (VO):

THE CROWN SERVES MANY FUNCTIONS, DEPENDING UPON THE DESIGN OF THE MACHINE. TYPICALLY, THE MOTOR, FLYWHEEL, CLUTCH AND BRAKE MOUNT ON THE CROWN. THE

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CRANKSHAFT END BEARINGS MAY ALSO BE LOCATED IN THE CROWN, OR IN SOME CASES, IN THE COLUMNS.

SCENE 28.
, SME2764, 01:19:03:00-01:19:07:00
tilt, mechanical straightside press columns up to crown
, SME2764, 01:12:13:00-01:13:20:00
c.u. gibs guiding slide
, CGS: Gib
, SME2764, 01:03:28:00-01:03:43:00
mechanical straightside press running

NARRATION (VO):

THE COLUMNS SUPPORT THE CROWN, AND HAVE ATTACHED, ADJUSTABLE GUIDES CALLED GIBS THAT GUIDE THE SLIDE. THE GIBS ENSURE PROPER PARALLELISM, SQUARENESS AND SLIDING FIT BETWEEN PRESS COMPONENTS.

SCENE 29.
continue previous shot

NARRATION (VO):

THE BED IS THE BASE OF THE MACHINE. IT MUST REST ON A SOLID LEVEL FOUNDATION TO ENSURE PROPER MACHINE FUNCTIONING.

SCENE 30.
, SME2764, 01:09:57:00-01:10:07:00
mechanical straightside press during stamping
SP030B, SME4138, 09:06:17:10 - 09:06:31:20
mechanical straightside press bolster with t-slots, worker securing die half

NARRATION (VO):

THE BOLSTER ADDS STIFFNESS TO THE PRESS BED AND ASSISTS IN SPREADING THE LOAD EVENLY OVER THE BED'S STRUCTURAL MEMBERS. THE BOLSTER HAS 'T' SLOTS OR TAPPED HOLES TO PERMIT SECURE FASTENING OF THE DIE.

--- TOUCH BLACK ---

SCENE 31.
, SME2693, 01:11:51:00-01:12:13:00
tilt of mechanical press, from motor to slide

ANI: press **(need to find)**

ANI: press feature highlighted**(need to find)**
, CGS: Flywheel

ANI: press feature highlighted**(need to**

NARRATION (VO):

IN A MECHANICAL PRESS, AN ELECTRIC MOTOR SUPPLIES THE ENERGY NEEDED TO STAMP PARTS. THERE ARE A NUMBER OF MOVING PARTS THAT STORE, CONTROL AND TRANSMIT THAT ENERGY TO THE DIE AND WORKPIECE.

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find)
, CGS: Gears

ANI: press feature highlighted, add arrow**(need to find)**
, CGS: Clutch

ANI: press feature highlighted**(need to find)**
, CGS: Crankshaft

ANI: press feature highlighted**(need to find)**
, CGS: Pitman

ANI: press feature highlighted, add arrows**(need to find)**
, CGS: Connection

ANI: press feature highlighted**(need to find)**
, CGS: Slide/Ram

ANI: press feature highlighted**(need to find)**
, CGS: Counterbalance

ANI: press feature highlighted, add arrows**(need to find)**
, CGS: Brake

THESE PARTS INCLUDE THE FLYWHEEL...,

GEARS...,

CLUTCH...,

CRANKSHAFT...,

PITMAN...,

CONNECTION...,

SLIDE OR RAM...,

COUNTERBALANCE...,

AND BRAKE.

SCENE 32.
, **SME2766, 04:00:42:00-04:00:50:00**
c.u. flywheel running
, CGS: Flywheel

NARRATION (VO):

THE FLYWHEEL STORES THE ENERGY SUPPLIED

BY THE MOTOR.

SCENE 33.
, **SME2695, 03:16:08:00-03:16:19:00**
c.u. gears turning
, CGS: Gears

NARRATION (VO):

THE GEARS REDUCE THE SPEED AND INCREASE

THE TORQUE DELIVERED BY THE FLYWHEEL

THROUGH THE CLUTCH. THIS IS KNOWN AS

GEAR REDUCTION.

SCENE 34.
, **SME2764, 01:19:39:00-01:19:43:00**
c.u. clutch running
, CGS: Clutch
, **SME2695, 03:16:21:00-03:16:27:00**
crankshaft turning
, CGS: Crankshaft
, **SME2756, 03:01:22:00-03:01:28:00**
c.u. eccentric drive

NARRATION (VO):

THE CLUTCH CONTROLS THE COUPLING AND

TRANSMISSION OF THE FLYWHEEL'S ENERGY TO

THE CRANKSHAFT...,

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, CGS: Eccentric Drive

OR ECCENTRIC DRIVE ON ECCENTRIC STYLE PRESSES.

SCENE 35.
, SME2695, 03:16:45:00-03:16:54:00
c.u. pitman, connection working
, CGS: Pitman
, CGS: Connection
SP035B, SME4421, 12:38:30:15 - 12:38:49:00
c.u. eccentric drive running
, CGS: Eccentric Strap

NARRATION (VO):

THE PITMAN TRANSMITS THE MOTION OF THE CRANKSHAFT TO THE SLIDE BY MEANS OF A BEARING KNOWN AS THE CONNECTION. ON ECCENTRIC PRESSES THE ECCENTRIC STRAP TRANSMITS THE MOTION.

SCENE 36.
, SME2693, 01:26:14:00-01:26:20:00
wide, slide in operation
, CGS: Slide/Ram

NARRATION (VO):

THE SLIDE, OR RAM, IS WHAT THE UPPER DIE IS FASTENED TO.

SCENE 37.
, SME2693, 01:12:02:00-01:12:12:00
c.u. counterbalance in operation
, CGS: Counterbalance

NARRATION (VO):

THE COUNTERBALANCE OFFSETS THE WEIGHT OF THE SLIDE, UPPER DIE AND ATTACHED LINKAGE DURING PRESS OPERATION.

SCENE 38.
, SME2694, 02:05:33:00-02:05:40:00
brake stopping press, press beginning to run, add arrow
, CGS: Brake

NARRATION (VO):

THE BRAKE STOPS THE PRESS AND HOLDS THE SLIDE AND ATTACHED MECHANISMS IN PLACE.

SCENE 39.
SP039A, SME4428, 16:13:32:15 - 16:13:45:00
straightside press
SP039B, SME4428, 16:31:19:00 - 16:31:33:15
wide of gap-frame press

NARRATION (VO):

VARIOUS PRESS PARTS, SUCH AS THE PITMAN, CONNECTION AND BOLSTER HAVE SIMILAR FUNCTIONS IN BOTH STRAIGHTSIDE..., AND GAP-FRAME PRESSES.

--- TOUCH BLACK ---

SCENE 40.
SP040A, SME4428 16:15:50:00 - 16:16:07:00
mechanical press motor

NARRATION (VO):

SEVERAL DRIVE ARRANGEMENTS ARE USED ON

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, CGS: Direct Drive
Single Gear Reduction
Double Gear Reduction

MECHANICAL PRESSES TO TRANSFORM THE ROTARY MOTION OF THE DRIVE MOTOR, THROUGH THE CRANKSHAFT, TO THE RECIPROCATING MOTION OF THE SLIDE. THESE ARRANGEMENTS INCLUDE:
DIRECT DRIVE,
SINGLE GEAR REDUCTION,
AND DOUBLE GEAR REDUCTION PRESSES.

SCENE 41.
, CGS: Direct Drive

ANI: direct drive arrangement

NARRATION (VO):

IN NONGEARED OR DIRECT DRIVE PRESSES, THE FLYWHEEL IS MOUNTED TO THE END OF THE CRANKSHAFT AND DRIVEN BY BELTS FROM THE MOTOR. HIGHER OPERATING SPEEDS ARE POSSIBLE WITH THIS ARRANGEMENT THAN WITH GEARED TYPE DRIVES.

SCENE 42.
, SME2760, 03:12:05:00-03:12:20:00
mechanical press with direct drive, stamping parts

NARRATION (VO):

OTHER ADVANTAGES OF THIS SIMPLE DESIGN INCLUDE FEWER MOVING PARTS TO WEAR OUT AND LESS FRICTIONAL LOSS OF MECHANICAL ENERGY.

SCENE 43.
continue previous shot
, SME2755, 01:22:29:00-01:22:46:00
tilt of direct drive press from crown to slide during downstroke

NARRATION (VO):

CERTAIN FACTORS LIMIT APPLICATION OF THE DIRECT DRIVE, HOWEVER. THE FULL-RATED FORCE OF THE MACHINE IS ONLY AVAILABLE VERY CLOSE TO THE BOTTOM OF THE STROKE; AND THE ABILITY TO DELIVER RATED FORCES IS SUBSTANTIALLY REDUCED IF THE PRESS OPERATES AT LESS THAN FULL SPEED.

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SCENE 44.
, CGS: Single Gear Reduction

ANI: single gear reduction drive

NARRATION (VO):

IN SINGLE GEAR REDUCTION PRESSES, THE FLYWHEEL IS MOUNTED ON THE BACKSHAFT AND POWER IS TRANSMITTED THROUGH A PINION TO A MAIN GEAR MOUNTED ON THE CRANKSHAFT.

SCENE 45.
continue previous shot

ANI: angular misalignment

ANI: front of press, focus on ram tipping alignment

NARRATION (VO):

A PROBLEM OCCURS WITH SINGLE-END DRIVE PRESSES, HOWEVER. ANGULAR MISALIGNMENT, PROPORTIONAL TO THE TORQUE TRANSMITTED THROUGH A CRANKSHAFT WITH TWO THROWS, CAUSES THE SIDE OF THE RAM NEAREST THE DRIVEN END OF THE CRANKSHAFT TO REACH BOTTOM DEAD CENTER BEFORE THE OTHER SIDE. THIS RESULTS IN A RAM-TIPPING ALIGNMENT ERROR.

SCENE 46.

ANI: angular misalignment remedy, crankshaft driven equally on both ends

ANI: angular misalignment remedy, eccentric drive
, CGS: Eccentric Gear

NARRATION (VO):

ANGULAR MISALIGNMENT OF THE CRANKSHAFT IS AVOIDED WHEN THE CRANKSHAFT IS DRIVEN EQUALLY ON BOTH ENDS. THIS PROVIDES MORE ACCURATE ALIGNMENT UNDER LOAD THAN WITH SINGLE-END DRIVE SYSTEMS. ADDITIONALLY, THIS ANGULAR MISALIGNMENT IS NOT AN ISSUE ON ECCENTRIC-GEAR PRESSES, IN WHICH AN ECCENTRIC IS FASTENED TO THE MAIN GEARS, THEREBY ELIMINATING THE USE OF A CRANKSHAFT ALTOGETHER.

SCENE 47.
, CGS: Double Gear Reduction

NARRATION (VO):

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ANI: double gear reduction drive arrangement
SP047B, SME4427, 15:02:07:00 - 15:02:18:00
deep draw operation

DOUBLE GEAR REDUCTION PRESSES HAVE TWO GEAR REDUCTIONS FROM THE FLYWHEEL TO THE CRANKSHAFT. THESE MACHINES NORMALLY ACHIEVE A SPEED RANGE FROM 8 TO 20 STROKES PER MINUTE AND ARE USED FOR DIFFICULT APPLICATIONS SUCH AS HEAVY DEEP DRAWING, COLD FORGING AND FLANGING OF LARGE PARTS.

--- TOUCH BLACK ---

SCENE 48.
SP048A, SME4423, 13:31:29:15 - 13:31:51:15
mechanical stamping press operating
, SME2764, 01:20:18:00-01:20:34:00
clutch disengaged, press stopped
, SME2764, 01:28:45:00-01:29:00:00
pullout, clutch engaged, then disengaged

NARRATION (VO):

CLUTCHES AND BRAKES ARE VITAL ELEMENTS OF A PRESS. VIRTUALLY ALL MECHANICAL PRESSES TRANSMIT THE ENERGY STORED IN THE FLYWHEEL TO THE SLIDE BY MEANS OF A CLUTCH MECHANISM. OTHERWISE THE SLIDE WOULD CYCLE CONTINUOUSLY WHENEVER POWER WAS APPLIED TO THE FLYWHEEL. WHEN THE CLUTCH IS NOT ENGAGED, THE SLIDE IS STOPPED AND MAINTAINED IN A STATIONARY POSITION BY A BRAKE.

SCENE 49.
, SME2760, 03:07:25:00-03:07:36:00
c.u. full revolution clutch, operating

NARRATION (VO):

MANY OLDER PRESSES USE A MECHANICAL FULL-REVOLUTION CLUTCH WHICH, WHEN ACTIVATED, CANNOT BE DISENGAGED UNTIL THE CRANKSHAFT MAKES ONE COMPLETE REVOLUTION.

SCENE 50.
SP050A, SME4423, 13:30:35:14 - 13:31:05:15
air friction clutch

NARRATION (VO):

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Continue shot SP050A above
air friction clutch

MOST MODERN PRESSES ARE EQUIPPED WITH AN AIR FRICTION CLUTCH AND BRAKE ARRANGEMENT COMMONLY CALLED A PARTIAL REVOLUTION CLUTCH, WHICH CAN BE DISENGAGED AT ANY POINT IN THE STROKE BEFORE THE CRANKSHAFT HAS COMPLETED A FULL REVOLUTION. THE AIR FRICTION CLUTCH PERMITS RAPID, DEPENDABLE STOPPING AND ENGAGEMENT IN MID-STROKE.

--- TOUCH BLACK ---

SCENE 51.

ANI: mechanical press a specified distance above bottom of stroke
, CGS: Force Capacity
SP051B, SME4428, 16:23:10:15 - 16:23:36:25
mechanical stamping presses operating
Cont, shot SP051B above
c.u. mechanical stamping presses operating

NARRATION (VO):

THE FORCE CAPACITY OF A MECHANICAL PRESS IS THE MAXIMUM FORCE THAT CAN BE EXERTED AT A SPECIFIED DISTANCE ABOVE THE BOTTOM OF THE STROKE BY THE DIES AGAINST A WORKPIECE. IT IS EXPRESSED IN TONS OR KILO-NEWTONS, AND IS OFTEN THE MAJOR CONSIDERATION IN THE SELECTION OF A PRESS.

SCENE 52.
continue previous shot

, CGS: Flywheel Energy
Torque Capacity

NARRATION (VO):

OTHER CRITERIA THAT DETERMINE FORCE CAPACITY OF A PRESS ARE FLYWHEEL ENERGY, AND TORQUE CAPACITY.

SCENE 53.
SP053A, SME4423 13:30:34:00 – 13:31:08:00
c.u. flywheel turning, clutch engaged, turning, stopping, flywheel turning, clutch engaged, turning, stopping

NARRATION (VO):

THE FLYWHEEL RECEIVES AND STORES ENERGY FROM THE MOTOR UNTIL A CERTAIN AMOUNT IS REMOVED BY EACH WORKING STROKE OF THE

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PRESS. ONCE THE FLYWHEEL IS UP TO SPEED AND THE PRESS IS NOT BEING CYCLED, THE MOTOR NEED ONLY SUPPLY ENOUGH ENERGY TO MAKE UP FOR FRICTIONAL LOSSES UNTIL THE NEXT STROKE.

SCENE 54.
, SME2693, 01:02:55:00-01:03:18:00
pan through geared mechanical press operating, from the flywheel, to the gears, clutch, crankshaft, connection, and slide, into the die

NARRATION (VO):

TORQUE CAPACITY IS THE ABILITY TO TRANSMIT THE ENERGY OF THE FLYWHEEL THROUGH THE GEARS, CLUTCH, CRANKSHAFT, CONNECTION AND SLIDE INTO THE DIE WITHOUT EXCEEDING THE SAFE WORKING CAPACITY OF ANY COMPONENT.

SCENE 55.
, SME2694, 02:05:22:00-02:05:30:00
flywheel on geared mechanical press
Split Screen
SP055A, SME4423, 13:31:26:00 - 13:31:50:00
gears of mechanical press operating
SP055B, SME, 13:31:59:02 – 13:32:24:00
Mechanical press operating

NARRATION (VO):

GEARED PRESSES ALLOW THE FLYWHEEL TO BE ROTATED FASTER WHILE THE SLIDE SPEED IS REDUCED. GEARING DOES NOT INCREASE FORCE OR ENERGY CAPACITY. THE GEAR RATIO IS PRIMARILY A MEANS FOR OBTAINING AN EFFICIENT FLYWHEEL SPEED.

--- TOUCH BLACK ---

SCENE 56.
, SME2773, 01:01:02:00-01:01:18:00
high speed mechanical press operating at about 300 parts per minute

NARRATION (VO):

THE DEFINITION OF HIGH-SPEED MECHANICAL PRESS OPERATION, IN TERMS OF STROKES PER MINUTE, IS NOT UNIVERSALLY AGREED UPON. AS A GENERAL RULE, HIGH-SPEED OPERATION INVOLVES PRESS SPEEDS OF 300 STROKES PER MINUTE OR GREATER.

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SCENE 57.
, **SME2773, 01:08:01:00-01:08:27:00**
high speed mechanical press producing small parts at about 1000 parts per minute

NARRATION (VO):

THE PRESS SPEED FOR SMALL HIGH-VOLUME PARTS CAN EXCEED 2000 STROKES PER MINUTE. HOWEVER, SUCH PRESSES GENERALLY OPERATE AT 1000 TO 1400 STROKES PER MINUTE FOR IMPROVED DIE LIFE AND PERFORMANCE, MORE CONSISTENT WORKPIECE QUALITY AND EASIER MATERIAL HANDLING.

SCENE 58.
, **SME2773, 01:05:08:00-01:05:28:00**
high speed mechanical press producing parts

NARRATION (VO):

MACHINE SIZE AND PART CONFIGURATIONS ARE FACTORS AFFECTING PRESS SPEEDS, AS ARE INERTIA AND VIBRATION OF MOVING PARTS OF THE PRESS.

SCENE 59.
, **SME2773, 01:03:35:00-01:03:57:00**
high speed mechanical press, c.u. press & die operating

NARRATION (VO):

COMMON FACTORS IN PRESSES DESIGNED FOR HIGH-SPEED OPERATION INCLUDE COMPACT ROBUST CONSTRUCTION, WITH SPECIAL ATTENTION GIVEN TO CLOSE FIT AND LUBRICATION OF BEARING SURFACES. EXCELLENT ALIGNMENT OF BOTH THE PRESS AND THE DIE IS CRITICAL, WITH THE PRESS AND DIE CONSIDERED AS A SINGLE SYSTEM.

--- FADE TO BLACK ---

SCENE 60.
, CGS: Hydraulic Presses
white text, centered on background
FMP BKG, motion background

SCENE 61.
, **SME2757, 01:14:42:00-01:14:48:00**

NARRATION (VO):

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hydraulic press in operation
SP061B, SME3534, 10:12:35:00 - 10:13:05:00
hydraulic press blanking sheet metal
SP061C, SME3534, 10:13:25:26 - 10:18:40:00
hydraulic press in operation

HYDRAULIC PRESSES ARE THE ALTERNATIVE TO MECHANICALLY DRIVEN PRESSES. THESE PRESSES USE ONE OR MORE CYLINDERS AND PRESSURIZED FLUID TO PROVIDE THE REQUIRED MOTION AND FORCE TO FORM OR BLANK WORKPIECES. WHILE MECHANICAL PRESSES ARE STILL THE PREDOMINANT TYPE, HYDRAULIC PRESSES ARE BECOMING INCREASINGLY MORE POPULAR.

SCENE 62.
, SME2757, 01:13:34:00-01:13:54:00
operation needing hydraulic press

ANI: hydraulic full force available contrasted with mechanical full force

NARRATION (VO):

THERE ARE METAL STAMPING APPLICATIONS WHERE HYDRAULIC PRESSES OFFER CERTAIN ADVANTAGES AND, IN SOME CASES, ARE THE ONLY MACHINES THAT CAN BE USED. ONE OF THE MAJOR BENEFITS IS THAT THE FULL FORCE OF THE HYDRAULIC PRESS CAN BE DELIVERED AT ANY POINT IN THE STROKE, NOT JUST AT THE BOTTOM OF THE STROKE AS WITH A MECHANICAL PRESS.

SCENE 63.
, SME2758, 02:01:14:00-02:01:35:00
hydraulic press, deep drawing operation

NARRATION (VO):

DEEP DRAWING AND FORMING APPLICATIONS OFTEN REQUIRE LARGE FORCES VERY HIGH IN THE STROKE. FEW MECHANICAL PRESSES HAVE TONNAGE CAPABILITY TO PERMIT SUCH APPLICATIONS.

SCENE 64.

SP064A, SME4427, 15:33:26:17 – 15:33:40:00
Two strokes on one machine render different shapes after adjustment
SP064B, SME4427, 15:35:41:07 – 15:35:47:25
Two strokes on one machine render

NARRATION (VO):

THE STROKE OF A HYDRAULIC PRESS CAN ALSO BE ADJUSTED TO PROVIDE OPTIMAL PART

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different shapes after adjustment
SP064C, SME4427, 15:36:26:00 – 15:36:34:22
Two strokes on one machine render different shapes after adjustment

Edit lapse these 3 shots so they show the different shape coming from one press with a height adjustment

CLEARANCE BEFORE CYCLING AGAIN.

MOREOVER, BECAUSE THE DESIRED PRESET HYDRAULIC PRESSURE PROVIDES A FIXED WORKING FORCE, IT IS WELL SUITED FOR DIFFERENT TOOL HEIGHTS AND VARIOUS MATERIAL THICKNESS'.

SCENE 65.
, SME2760, 03:05:08:00-03:05:20:00
compact hydraulic press operating
SP065B, SME4427, 15:31:40:00 - 15:31:57:10
hydraulic press in operation

NARRATION (VO):

HYDRAULIC PRESSES ARE MORE COMPACT THAN MECHANICAL PRESSES OF COMPARABLE CAPACITY AND HAVE FEWER MOVING PARTS, AND ARE IDEALLY SUITED FOR MANY APPLICATIONS, SUCH AS NON-AUTOMATED OPERATIONS AND SMALL LOT SIZES.

--- TOUCH BLACK ---

SCENE 66.
, SME2756, 02:21:16:00-02:21:20:00
wide, mechanical gap-frame press
SP066B, SME4427, 15:09:42:00 - 15:09:44:00
wide, hydraulic straightside press
, SME2756, 02:03:50:00-02:03:54:00
wide, mechanical straightside press
SP066D, SME4311, 03:34:43:15 – 03:35:07:02
wide, mechanical gap-frame press
, SME2764, 01:01:51:00-01:01:55:00
wide, mechanical straightside press
, SME2760, 03:05:48:00-03:05:52:00
wide, hydraulic gap-frame press
SP066G, SME4421, 12:01:50:01 - 12:02:15:15
wide, mechanical gap-frame press

NARRATION (VO):

PROPER SELECTION OF A PRESS IS ESSENTIAL FOR SUCCESSFUL AND ECONOMICAL OPERATION. IT IS IMPORTANT TO NOTE, HOWEVER, THAT NO GENERAL-PURPOSE PRESS EXISTS THAT CAN PROVIDE MAXIMUM PRODUCTIVITY FOR ALL APPLICATIONS. COMPROMISES MUST BE MADE IF A PRESS IS TO BE USED FOR MORE THAN ONE JOB.

SCENE 67.
continue previous shot

, CGS: Press Size
Press Force
Energy Requirements
Speed Requirements

, SME2764, 01:09:03:00-01:09:27:00

NARRATION (VO):

FACTORS THAT MUST BE CONSIDERED DURING PRESS SELECTION INCLUDE:

PRESS SIZE,

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wide, mechanical straightside press operating

PRESS FORCE,

ENERGY REQUIREMENTS,

AND SPEED REQUIREMENTS. THE PRESS MUST

BE CAPABLE OF EXERTING FORCE IN THE

AMOUNT, LOCATION, AND DIRECTION AS WELL

AS FOR THE LENGTH OF TIME NEEDED TO

PERFORM THE SPECIFIED OPERATIONS.

SCENE 68.
SP, SME4421, 12:11:19:16 - 12:11:37:12
zoom out, stamping operation

, CGS: Size & Geometry of the Workpieces
Operations to be Performed
Workpiece Quantities
Production Rate
Workpiece Accuracy
Finish Requirements
Equipment Costs

NARRATION (VO):

OTHER PRESS SELECTION CONSIDERATIONS

MUST INCLUDE: THE SIZE AND GEOMETRY OF

THE WORKPIECES,

OPERATIONS TO BE PERFORMED,

WORKPIECE QUANTITIES,

PRODUCTION RATE NEEDED,

WORKPIECE ACCURACY,

FINISH REQUIREMENTS,

AND EQUIPMENT COSTS.

--- FADE TO BLACK ---

SCENE 69.
, CGS: Press Controls
white text, centered on background
FMP BKG, motion background

SCENE 70.
SP070A, SME4428, 16:34:09:00 – 16:34:31:00
zoom oout from c.u. press controls,

, CGS: Electrical
Electro-Mechanical
Pneumatic
Hydraulic
Electronic
, SME2692, 01:08:18:00-01:08:25:00
simple controls, motor, starter & disconnect switch
, SME2757, 01:09:24:00-01:09:37:00
pan of multi-motor control with sensors &

NARRATION (VO):

PRESS CONTROLS INVOLVE ELECTRICAL,

ELECTRO-MECHANICAL, PNEUMATIC,

HYDRAULIC, ELECTRONIC, AND OTHER

EQUIPMENT USED TO CONTROL THE OPERATION

OF PRESSES. COMPLEXITY OF CONTROLS

RANGES FROM A SIMPLE STARTER AND

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control systems

DISCONNECT SWITCH TO A SOPHISTICATED MULTI-MOTOR, MULTI-FUNCTION CONTROL INCORPORATING A VARIETY OF SENSORS, CONTROL SYSTEMS AND DEVICES.

SCENE 71.
SP071A, SME4427, 15:42:27:07 -15:42:40 10
pan from press controls to manually loaded part being stamped
SP071B, SME4428, 16:34:09:11 – 16:34:29:23
tonnage control during operation **NA**
SP071C, SME4428, 16:19:22:21 – 16:19:38:00
big sensor box on press **NA**
SP071D, SME4428, 16:20:21:15 – 16:21:02:00
load indicator **NA**
SP071E, SME4428, 16:26:02:13 – 16:26:23:18
pull back, stamping operation
In above

NARRATION (VO):

IN ADDITION TO CONTROLLING THE MOTION OF A PRESS'S MOVING ELEMENTS, A CONTROL SYSTEM SHOULD ALLOW A STAMPING OPERATION TO YIELD CONSISTENT, PREDICTABLY HIGH PRODUCTION RATES WITHOUT JEOPARDIZING THE SAFETY OF OPERATING PERSONNEL, THE PRESS, OR DIES.

SCENE 72.
SP072A, SME4428, 16:19:55:10 - 16:20:10:16
press controls for mechanical press
SP072B, SME4428, 16:18:40:26 - 16:18:58:05
cnc controls on automated mechanical press
SP072C, SME4393, 03:36:31:20 - 03:36:55:23
c.u. cnc controls on automated mechanical
SP072D, SME4393, 03:38:03:13 - 16:38:26:00
parts being stamped,

NARRATION (VO):

SYSTEMS FOR CONTROLLING MECHANICAL POWER PRESSES ARE MOSTLY ELECTRO-MECHANICAL OR SOLID STATE. HOWEVER, COMPUTER NUMERICAL CONTROL OR ‘CNC’ SYSTEMS AND PROGRAMMABLE LOGIC CONTROLLERS OR ‘PLC'S’ ARE ALSO BEING USED, ESPECIALLY ON MORE COMPLEX, HIGHLY AUTOMATED SYSTEMS. SELF-CHECKING AND DIAGNOSTIC FEATURES, WITH FAST RESPONSE TO SENSORS, ARE BECOMING INCREASINGLY IMPORTANT IN AUTOMATED STAMPING OPERATIONS.

--- FADE TO BLACK ---

SCENE 73.
, CGS: Press Feeding
white text, centered on background
FMP BKG, motion background

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SCENE 74.
, SME2757, 01:04:58:00-01:05:20:00
pull back of stamping operation with sheet metal fed to die
SP074A, SME4393, 03:09:29:26 – 03:09:55:07
sheet metal part fed from die
SP074B, SME4314A, 06:06:08:13–06:06:31:07
sheet metal part fed between presses

NARRATION (VO):

NO MATTER WHAT TYPE OF PRESS IS USED,

SHEET-METAL STAMPING CANNOT BEGIN UNTIL

STOCK IS FED INTO THE DIE. A WIDE

VARIETY OF EQUIPMENT IS AVAILABLE TO

TRANSFER SHEET METAL MATERIAL TO...,

FROM...,

OR BETWEEN PRESSES.

SCENE 75.
, SME2694, 02:11:24:00-02:11:32:00
manually feeding blanks to press
, SME2764, 01:02:42:00-01:03:02:00
manually feeding blanks to press, hand guards used while feeding

NARRATION (VO):

THE FEEDING OF BLANKS OR PREVIOUSLY

FORMED STAMPINGS TO PRESSES IS

ACCOMPLISHED IN SEVERAL WAYS. ONE OF THE

MOST COMMON IS MANUAL FEEDING, WHICH IS

GENERALLY LIMITED TO LOW-VOLUME

PRODUCTION. MANUAL FEEDING REQUIRES THE

USE OF POINT-OF-OPERATION GUARDING OR

HAND FEEDING TOOLS TO KEEP OPERATORS'

HANDS AND FINGERS OUT OF THE DIE AREA.

SCENE 76.
, SME2757, 01:04:45:00-01:04:56:00
magazine/vacuum cup feeding blanks to press by transfer unit
, SME2757, 01:07:58:00-01:08:05:00
robotic press loading
, SME2757, 01:17:53:00-01:17:57:00
robotic press unloading

NARRATION (VO):

MAGAZINES HOLDING STACKS OF BLANKS CAN

BE FED AUTOMATICALLY ONE AT A TIME BY

VACUUM CUPS AND MOVED TO THE DIE BY

TRANSFER UNITS.

ROBOTS ARE ALSO USED FOR PRESS

LOADING...,

AND UNLOADING.

SCENE 77.
, SME2756, 02:02:17:00-02:02:24:00
sheet metal coil, wide

NARRATION (VO):

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sheet metal coil
, **SME2756, 02:09:55:00-02:10:00:00**
sheet metal coil, thin
, **SME2760, 03:09:30:00-03:09:50:00**
coil stock feeder automatically feeding press

SHEET METAL STOCK IS OFTEN USED IN COIL FORM. COILS ARE AVAILABLE IN VARIOUS WIDTHS AND A RANGE OF THICKNESSES. COIL STOCK IS FED INCREMENTALLY BETWEEN THE DIE HALVES WITHIN THE PRESS BY A STOCK FEEDER THAT OPERATES AUTOMATICALLY IN SYNCHRONIZATION WITH THE PRESS CYCLE.

SCENE 78.
, **SME3548, 21:08:07:00-21:08:19:00**
pan, coil line feeding sheet metal to press

NARRATION (VO):

THE FEEDING OF SHEET METAL COIL STOCK IS MORE EFFICIENT THAN FEEDING INDIVIDUAL CUT BLANKS SINCE COILED MATERIAL ALLOWS CONTINUOUS PROCESSING.

SCENE 79.
, **SME3528, 02:12:17:00-02:12:38:00**
pan of coil processing line

NARRATION (VO):

USE OF COIL STOCK FOR FEEDING, HOWEVER, REQUIRES INVESTMENT IN A COIL PROCESSING LINE. SUCH LINES CAN VARY IN COST AND COMPLEXITY, DEPENDING UPON THE SOPHISTICATION OF THE COMPONENTS USED, BUT ARE NECESSARY TO HANDLE THE WEIGHT OF COILED MATERIAL.

SCENE 80.
, **SME3528, 02:28:18:00-02:28:27:00**
uncoiling of sheet metal
, CGS: Uncoiling
, **SME3528, 02:27:14:00-02:27:22:00**
coil being straightened
, CGS: Straightening/
Leveling
, **SME3528, 02:24:46:00-02:24:54:00**
c.u. coil being fed to press
, CGS: Feeding
, **SME3528, 02:21:41:00-02:21:52:00**
zoom in, coil skeleton being chopped up
, CGS: Scrap Processing

NARRATION (VO):

THE BASIC FUNCTIONS OF MOST COIL-PROCESSING LINES INCLUDE UNCOILING...,

STRAIGHTENING OR LEVELING THE COIL STOCK...,

FEEDING COIL STOCK FOR PARTS PROCESSING...,

AND SCRAP PROCESSING.

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--- TOUCH BLACK ---

SCENE 81.
, CGS: Uncoiling
, **SME3529, 03:01:35:00-03:01:42:00**
uncoiling of sheet metal
, **SME3529, 03:12:19:00-03:12:31:00**
loading coil onto pay-off reel
, **SME3547, 20:19:44:00-20:19:52:00**
loading coil into cradle

NARRATION (VO):

THE UNCOILING OF SHEET METAL ROLLS BEGINS WITH LOADING COILS ONTO PAY-OFF REEL SPINDLES...,
OR INTO CRADLES USING A VARIETY OF COIL HANDLING DEVICES AND EQUIPMENT.

SCENE 82.
, CGS: Pay-Off Reels
, **SME3527, 01:04:07:00-01:04:20:00**
zoom out, pay-off reel dispensing coil stock
, **SME3528, 02:26:18:00-02:26:23:00**
vertical pay-off reel
, **SME3528, 02:08:12:00-02:08:20:00**
horizontal pay-off reel
, **SME3533, 08:20:39:00-08:20:47:00**
vertical powered pay-off reel dispensing coil stock
, **SME2755, 01:01:50:00-01:01:58:00**
non-powered pay-off reel dispensing coil stock

NARRATION (VO):

PAY-OFF REELS HOLD COILS ON THEIR INSIDE DIAMETERS AND ARE USED EXTENSIVELY FOR UNCOILING. PLATES OR ARMS ARE PROVIDED TO CONTAIN STOCK IN THE REEL. PAY-OFF REELS ARE AVAILABLE IN A VARIETY OF STYLES AND ORIENTATIONS...,
AND CAN ALSO BE POWERED...,
OR NON-POWERED.

SCENE 83.
, CGS: Cradles
, **SME3548, 21:04:09:00-21:04:24:00**
cradle dispensing thick coil stock
, **SME3547, 20:25:40:00-20:25:55:00**
tilt up, cradle dispensing coil stock

NARRATION (VO):

UNCOILING CRADLES SUPPORT COILS ON THEIR OUTSIDE DIAMETERS WITH AIR- OR HYDRAULIC-CUSHIONED SUPPORT ROLLS. CRADLES ARE BEST SUITED FOR COILS OF THICKER STOCK AND APPLICATIONS IN WHICH PROTECTION OF THE STOCK SURFACE IS NOT CRITICAL. CRADLES MAY BE POWERED OR NON-POWERED.

--- TOUCH BLACK ---

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SCENE 84.
, CGS: Straightening/
Leveling

, **SME2755, 01:03:26:00-01:03:40:00**
pan from coil to stock
straightener/leveler, stock advancing
through
, **SME2760, 03:03:30:00-03:03:36:00**
c.u. stock straightener/leveler, stock
advancing through
, **SME3533, 08:06:55:00-08:07:11:00**
zoom in, coil stock running between
opposing rollers

NARRATION (VO):

SHEET METAL STOCK, AS IT IS UNCOILED,

HAS A SET, OR CURVATURE, WHICH THE

STRAIGHTENER OR LEVELER REMOVES BY

FLEXING THE MATERIAL BETWEEN OPPOSING,

ADJUSTABLE ROLLERS AS IT MOVES TOWARD

THE PRESS, THUS PROVIDING FLAT MATERIAL

FOR FEEDING INTO THE STAMPING DIE.

--- TOUCH BLACK ---

SCENE 85.
, CGS: Feeding
, **SME2757, 01:07:58:00-01:08:05:00**
zoom out, slide feeding of coil stock
, CGS: Slide/Gripper Feeds
, **SME2760, 03:10:26:00-03:10:32:00**
press driven roll feeding of coil stock
, CGS: Roll Feeds

NARRATION (VO):

THERE ARE NUMEROUS METHODS OF

AUTOMATICALLY FEEDING SHEET METAL COIL

STOCK, WITH THE PRIMARY TYPES BEING:

SLIDE, OR GRIPPER, FEEDS...,

AND ROLL FEEDS.

SCENE 86.
, CGS: Slide Feeds
, **SME2766, 04:05:25:00-04:05:39:00**
zoom out, slide feed, feeding coil
, **SME3547, 20:11:38:00-20:11:57:00**
zoom out, air slide feed reciprocating
along guide rod

NARRATION (VO):

TYPICALLY, SLIDE FEEDS HAVE A GRIPPER

ARRANGEMENT WHICH CLAMPS AND FEEDS THE

COIL STOCK DURING ITS FORWARD MOVEMENT

AND THEN RELEASES IT AND RETURNS FOR THE

NEXT CYCLE. TO INSURE ACCURACY, MOST

SLIDE FEEDS RECIPROCATE ON GUIDE RODS OR

SLIDES BETWEEN ADJUSTABLE POSITIVE

STOPS.

SCENE 87.
, **SME3547, 20:05:15:00-20:05:42:00**
pan, air slide feed processing coil to
press
, CGS: Press-Driven
Air

NARRATION (VO):

SLIDE FEEDS ARE AVAILABLE IN VARIOUS

TYPES INCLUDING:

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Hydraulic
Independently-Driven

PRESS-DRIVEN,

AIR,

HYDRAULIC,

AND INDEPENDENTLY DRIVEN SLIDE FEEDS.

--- TOUCH BLACK ---

SCENE 88.
, CGS: Roll Feeds
, **SME3533, 08:10:41:00-08:11:21:00**
zoom out, roll feeding on press

NARRATION (VO):

ROLL FEEDS ARE THE MOST PREDOMINATE FEED TYPE USED. ROLL FEEDS ADVANCE COIL STOCK BY PRESSURE EXERTED BETWEEN INTERMITTENTLY DRIVEN OPPOSED ROLLS, WHICH ALLOW THE STOCK TO DWELL DURING THE WORKING PART OF THE PRESS STROKE.

SCENE 89.
, **SME3533, 08:05:20:00-08:05:46:00**
zoom out, independently-powered servomotor-driven roll feed
, **SME2760, 03:09:27:00-03:09:45:00**
zoom out, intermittent rotation of roll feed

NARRATION (VO):

ROLL FEEDS ARE AVAILABLE IN SEVERAL TYPES AND A WIDE VARIETY OF SIZES SUITABLE FOR ALMOST ANY WIDTH AND THICKNESS OF STOCK. THEY CAN FEED IN SHORT OR LONG LENGTHS, WITH HIGH SPEEDS FOR SHORT INCREMENTS.

SCENE 90.
continue previous shot
, **SME3534, 09:04:13:00-09:04:37:00**
zoom out, independently-powered roll feed

NARRATION (VO):

INTERMITTENT ROTATION, OR INDEXING OF THE FEED ROLLS IN ONLY ONE DIRECTION, CAN BE PRESS ACTUATED..., OR BE INDEPENDENTLY POWERED.

SCENE 91.
continue previous shot
, CGS: Electric Motor
Air
Hydraulic
, **SME3528, 02:24:25:00-02:24:40:00**

NARRATION (VO):

INDEPENDENTLY POWERED ROLL FEEDS HAVE SELF-CONTAINED ELECTRIC MOTOR,

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zoom in, independently-powered servomotor-driven roll feed

AIR,

OR HYDRAULIC POWER DRIVES.

MOST POPULAR, HOWEVER, IS THE

SERVOMOTOR-DRIVEN, DIGITALLY CONTROLLED

ROLL FEED.

SCENE 92.
continue previous shot
, **SME3529, 03:03:01:00-03:03:19:00**
zoom out, servomotor roll feed running independent of press

NARRATION (VO):

BY COMBINING ADVANCED ELECTRONIC

CONTROLS WITH USER-FRIENDLY OPERATING

PROGRAMS, THE SERVOMOTOR-DRIVEN,

DIGITALLY CONTROLLED ROLL FEED BECOMES

AN INTELLIGENT ACCESSORY WITHOUT ANY

MECHANICAL INTERLOCK TO THE PRESS, THUS

PROVIDING THE FLEXIBILITY TO OPERATE

INDEPENDENTLY OF THE PRESS.

SCENE 93.
, **SME3528, 02:01:03:00-02:01:35:00**
zoom out, zig-zag feed coil being used in stamping operation
, **SME3528, 02:11:07:00-02:11:34:00**
zoom in, zig-zag feed coil being used
, CGS: Joggle
Zig-Zag
Oscillating
Shuttle

NARRATION (VO):

TO PERMIT BETTER MATERIAL UTILIZATION,

VARIOUS FEED TYPES ARE USED IN

CONJUNCTION WITH SERVOMOTOR AND OTHER

INDEPENDENT FEEDERS. THESE FEEDS

INCLUDE:

JOGGLE,

ZIG-ZAG,

OSCILLATING,

AND SHUTTLE FEEDS.

SCENE 94.
continue previous shot
, **SME3529, 03:14:23:00-03:14:39:00**
zoom out, c.u. coil stock from zig-zag feed

NARRATION (VO):

THESE FEED UNITS SIMULTANEOUSLY ADVANCE

THE MATERIAL AND SHUTTLE IT FROM SIDE-

TO-SIDE SO THAT TWO OR MORE STAGGERED OR

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NESTED BLANKS ARE PRODUCED, ONE PER PRESS STROKE, ACROSS THE COIL WIDTH.

SCENE 95.
, SME3529, 03:06:09:00-03:06:32:00
zoom in, shuttle feed coil being used

NARRATION (VO):

USING A WIDER COIL TO PRODUCE INTERSPERSED BLANKS RESULTS IN A REDUCTION IN SCRAP COMPARED TO USE OF A NARROWER COIL THAT WOULD PRODUCE A SINGLE BLANK WITH HIGHER UNIT MATERIAL COSTS. THIS IS ESPECIALLY TRUE WHEN PRODUCING ROUND OR IRREGULARLY SHAPED BLANKS.

--- TOUCH BLACK ---

SCENE 96.
, CGS: Scrap Processing
, SME3534, 09:05:56:00-09:06:14:00
zoom out, coil be cut into scrap using the die
, SME2760, 03:12:03:00-03:12:16:00
zoom out, press actuated scrap cutter

NARRATION (VO):

ONCE COIL STOCK IS PROCESSED, IT IS NECESSARY TO DISPOSE OF THE REMAINING SKELETON AS SCRAP. SCRAP PROCESSING CAN BE A FUNCTION OF THE STAMPING DIE ITSELF, BUT CAN ALSO BE PERFORMED USING SCRAP CUTTERS, OR CHOPPERS THAT HAVE UPPER AND LOWER BLADES TO SHEAR UP THE REMAINING MATERIAL.

SCENE 97.
, SME2760, 03:11:10:00-03:11:30:00
press actuated scrap cutter
, SME2755, 01:07:50:00-01:08:06:00
free-standing scrap cutter cutting up coil skeleton

NARRATION (VO):

SCRAP CUTTERS ARE TYPICALLY PRESS ACTUATED...,
BUT ARE ALSO AVAILABLE AS FREE-STANDING UNITS WITH INDEPENDENT POWER.

--- FADE TO BLACK ---

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SCENE 98.
FMP RVW, CGS: Review
white text, centered on background
FMP BKG, motion background

NARRATION (VO):

LET'S REVIEW THE MATERIAL CONTAINED IN THIS PROGRAM.

SCENE 99.
, SME2694, 02:22:18:00-02:22:34:00
forming operation with little scrap

NARRATION (VO):

METAL FORMING OPERATIONS SHAPE PARTS BY THE IMPACT OF TOOLING ON SHEET METAL STOCK AT A RELATIVELY HIGH RATE OF SPEED WITH MINIMAL OPERATOR INTERVENTION.

SCENE 100.
, SME2693, 01:12:14:00-01:12:23:00
press operating
, SME2693, 01:23:03:00-01:23:16:00
c.u. die impacted

NARRATION (VO):

THE PURPOSE OF THE PRESS IS TO PROVIDE THE MOTIVE FORCE FOR THE STAMPING OPERATION. THE DESIGN OF THE FINISHED STAMPING IS DETERMINED BY THE SHAPE OF TOOLING WITHIN THE DIE.

SCENE 101.
SP014A, SME4423, 13:31:38:00- 13:31:44:00
mechanical press operating
SP014B, SME4423, 13:11:42:00 – 13:11:50:00
hydraulic press operating
SP014C, SME4423, 13:32:35:00 – 13:32:49:00
pan down press to stamping operation
SP014D, SME4423, 13:48:12:20 – 13:48:22:22
wide, press operating

NARRATION (VO):

PRESSES CAN BE CLASSIFIED BY HOW THEY ARE POWERED: EITHER MECHANICAL...,
OR HYDRAULIC.
BUT MORE TYPICALLY, THEY ARE CLASSIFIED BY FRAME CONFIGURATION, THAT IS 'C' OR GAP FRAME...,
OR STRAIGHTSIDE.

SCENE 102.

ANI: press

ANI: press feature highlighted
, CGS: Flywheel

ANI: press feature highlighted
, CGS: Gears

NARRATION (VO):

IN A MECHANICAL PRESS, AN ELECTRIC MOTOR SUPPLIES THE WORKING ENERGY AS A NUMBER OF MOVING PARTS STORE, CONTROL, AND TRANSMIT THAT ENERGY TO THE WORKPIECE

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ANI: press feature highlighted, add arrow
, CGS: Clutch

ANI: press feature highlighted
, CGS: Crankshaft

ANI: press feature highlighted
, CGS: Pitman

ANI: press feature highlighted, add arrows
, CGS: Connection

ANI: press feature highlighted
, CGS: Slide/Ram

ANI: press feature highlighted
, CGS: Counterbalance

ANI: press feature highlighted, add arrows
, CGS: Brake

THROUGH THE DIE. ENERGY TRANSMITTING

COMPONENTS INCLUDE THE FLYWHEEL...,

GEARS...,

CLUTCH...,

CRANKSHAFT...,

PITMAN...,

CONNECTION...,

SLIDE OR RAM...,

COUNTERBALANCE...,

AND BRAKE.

PRESS TONNAGE REQUIREMENTS ARE BASED

PRIMARILY ON LINEAR MEASUREMENTS, BUT

WILL ALSO INCLUDE A STOCK THICKNESS,

ALLOY TYPES, AND PART COMPLEXITY.

SCENE 103.
SP017C, SME4428, 16:30:45:14 - 16:31:00:00
high speed mechanical press operating at
about 1000 parts per minute

NARRATION (VO):

SO-CALLED HIGH-SPEED PRESSES OPERATE AT

SPEEDS RANGING FROM 300 TO 2000 STROKES

PER MINUTE, WITH 1000 TO 1400 STROKES

PER MINUTE BEING THE OPTIMUM SPEED

RANGE.

SCENE 104.
SP014B, SME4423, 13:11:42:00 – 13:11:50:00
hydraulic press in operation
, **SME2757, 01:13:34:00-01:13:54:00**
operation needing hydraulic press

NARRATION (VO):

HYDRAULIC PRESSES USE ONE OR MORE

CYLINDERS CONTAINING PRESSURIZED FLUID

TO PROVIDE THE REQUIRED MOTION AND FORCE

TO STAMP PARTS. THEY OFTEN HAVE

ADVANTAGES OVER MECHANICAL PRESSES,

ESPECIALLY IN SITUATIONS WHERE FULL

FORCE IS NEEDED HIGH UP IN THE WORKING

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SCENE 105.
, SME2694, 02:11:24:00-02:11:32:00
manually feeding blanks to press
, SME2757, 01:04:45:00-01:04:56:00
magazine/vacuum cup feeding blanks to press by transfer unit
, SME2757, 01:07:58:00-01:08:05:00
independent slide/gripper feeder, operating
, SME2760, 03:10:26:00-03:10:32:00
press driven coil roll feeder
, SME3547, 20:05:15:00-20:05:42:00
air slide feeding of stock

SCENE 106.
continue music, up and under
SP CRX, CGS, ROLL: credits
white text, fade up mid-screen
FMP EXM, extended motion background

STROKE.

NARRATION (VO):

THERE ARE MANY OPTIONS AVAILABLE FOR

FEEDING BLANKS...,

AND COILED SHEET METAL STOCK TO STAMPING

PRESSES.

--- FADE TO BLACK ---

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SCENE 107.
continue motion background
FMP DIS, CGS: disclaimer
white text, centered on background

Some machinery in this program had safety equipment removed to allow better recording of certain processes. Always read the safety information provided in the manufacturers' manual before machine operation.

SCENE 108.
FMP SME, SME logo open, with music