



METAL FORMING CONSULTING 2025

METAL FORMING CONSULTING

Organizational Chart MFC



 **Fidel López Vallejo**

40 years of experience in forging processes and designing new technologies, heat treatments, SMED, and R&D.

 **Blas Castañeda**

 **Armando Grijalba**

 **Aurelio Ruiz**

 **Alfredo Almanza**

 **José Medina**

 **Xavier Guarderas**

- 35 years of experience in forging processes
- 25 years as Engineering Manager at Dana
- Expertise in forging crowns, yokes, pins, and half-shafts
- Proficient in hot and warm forging
- Strong focus on teamwork
- Implementation of SMED methodologies

- 28 years of experience in forging processes
- Management and administration of investment projects
- Focus on creativity and innovation
- Proactive in analyzing and solving process and design issues
- Coaching and talent development

- 40 years of experience in forging processes
- Specialist in hot and warm forging design
- Design and development of die sets
- Development of heat treatment processes for presses, headers, and hammers
- Product development for the automotive and oil & gas industries

- 40 years of experience in forging processes
- Expertise in forging using presses, headers, hammers, billet cutting shears, tooling assembly, and model changeovers
- Training personnel in forging processes

- 40 years of experience in the metal-mechanical industry
- Specialist in Quality Control and Statistical Process Control (SPC)
- Proficient in managing metallurgical laboratories
- Development and optimization of heat treatment processes
- Application of Lean Manufacturing and Six Sigma methodologies
- Strong focus on continuous improvement and operational efficiency

- 10 years of experience in forging processes
- Development and optimization of forging operations
- Tooling design for forging applications
- Finite Element Method (FEM) simulation
- Preparation of technical and commercial quotations
- Implementation of SMED methodologies
- Research and Development (R&D)
- Master's degree in Automotive Engineering



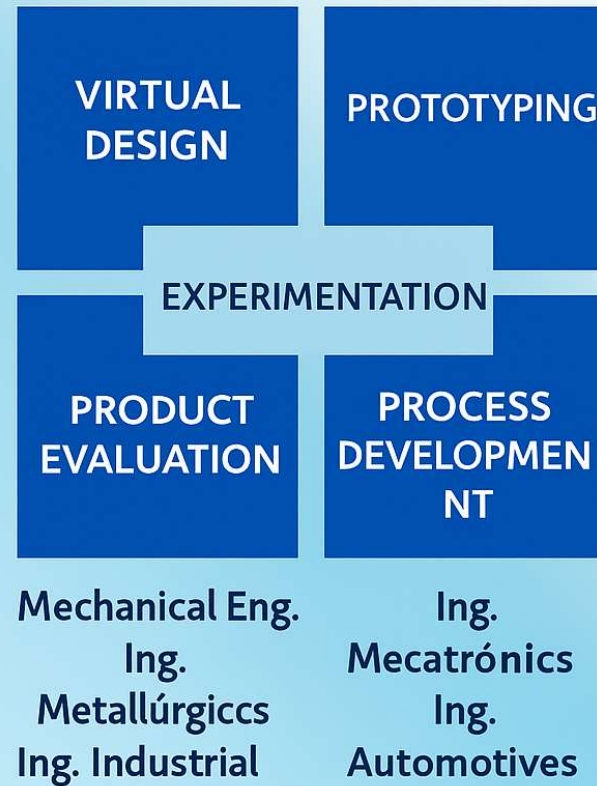
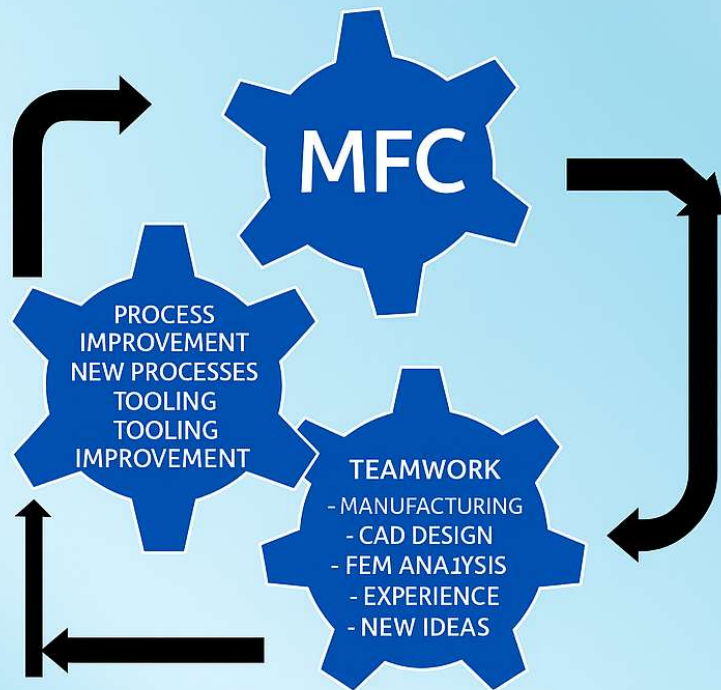
Metal Forming Consulting

- **40 years of experience in Forging process and the design of new Technologies, Heat treatments, SMED, and R&D**
- Consulting and support in forging process design, tooling, die sets, trimming dies, deburring, punching, and related operations.
- Specialists in hot and warm forging using mechanical and hydraulic presses, headers, and hammers, for parts ranging from 0.250 kg to 150 kg.
- Selection and specification of forging equipment: induction systems, heat treatment furnaces (normalizing, annealing, quenching in polymer or oil), disc cutters, and barrel or worm-type shot blasters.
- Advisory on the foundation and installation of forging equipment and industrial facilities.
- Training for engineers in tooling design and forging process development.
- Installation of complete forging lines, both automated and manual.
- Developing new products using virtual design to ensure quality and shorten new project launch times.
- Design of die sets using advanced technologies to enable fast model changeovers.

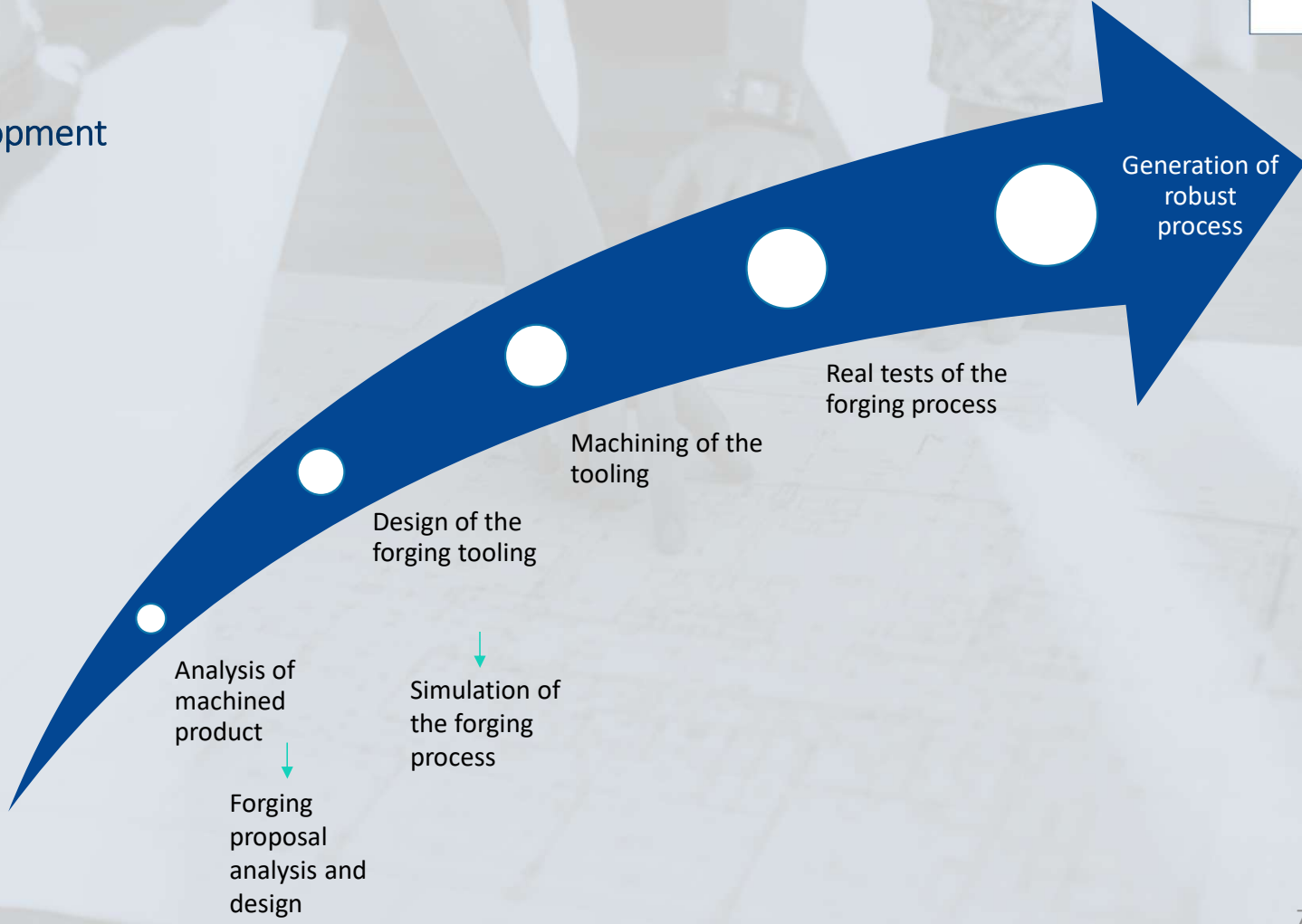
Automotive Division



WORK MODEL AND NEW PRODUCT DEVELOPMENT



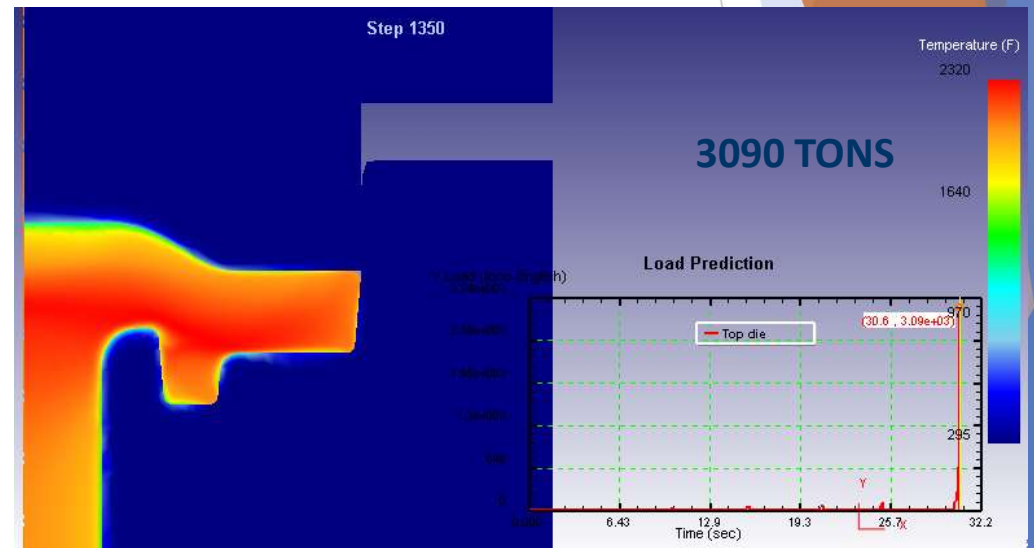
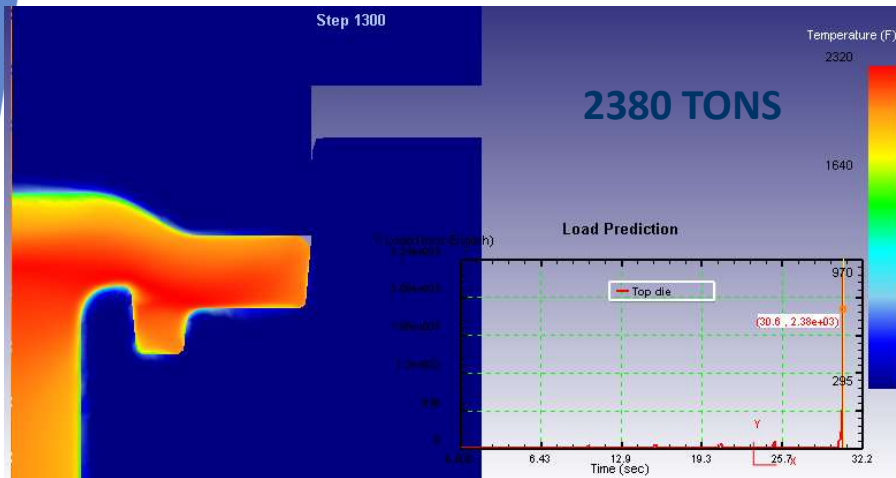
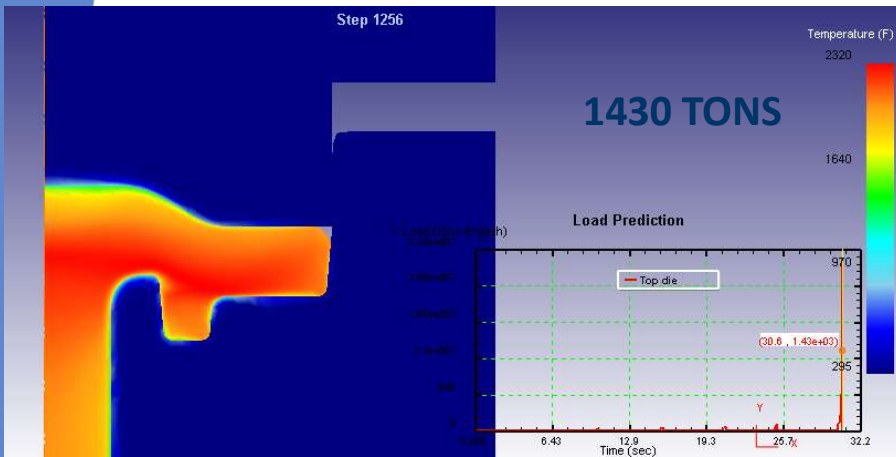
Process development



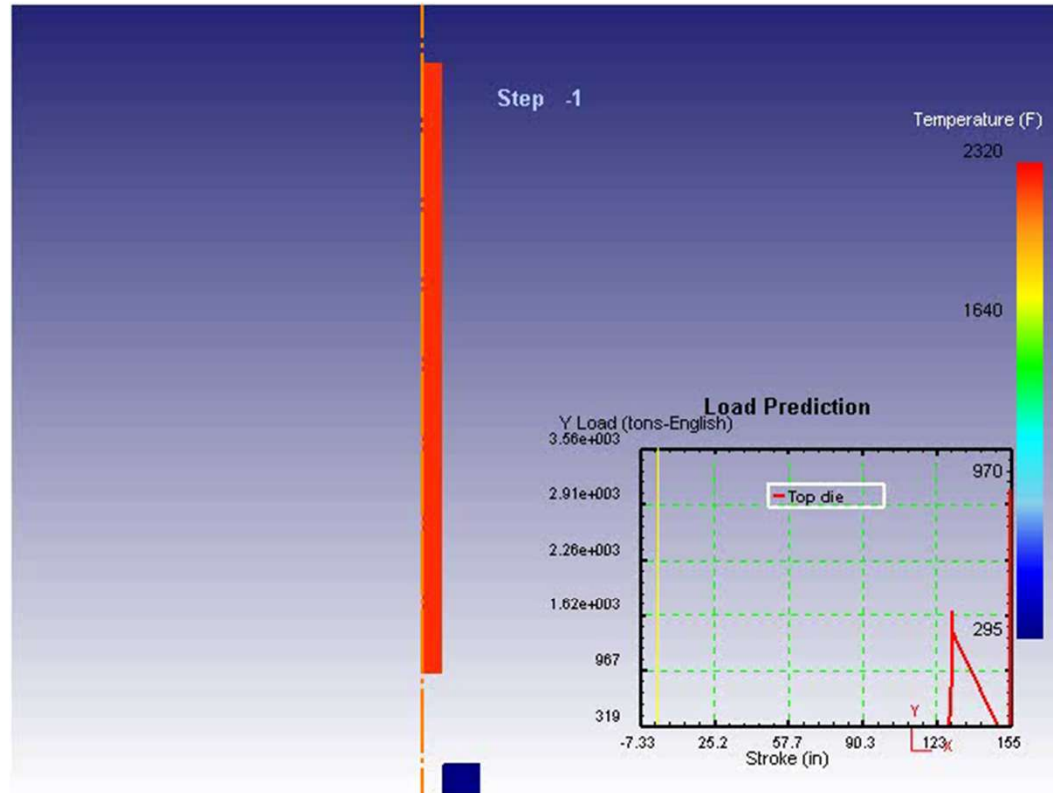
ADVANTAGES —

- Application of virtual design to ensure product quality.
- Development of new projects in less time and at lower cost, avoiding trial-and-error processes.
- Prevention of quality issues such as laps and cracks, while improving tooling design.
- Use of specialized software for simulations through virtual design.

FLANGE FILLING 1504372019 WITH MACHINE LOCK BY PROCESS SIMULATION



Example of Virtual Design or Process Simulation



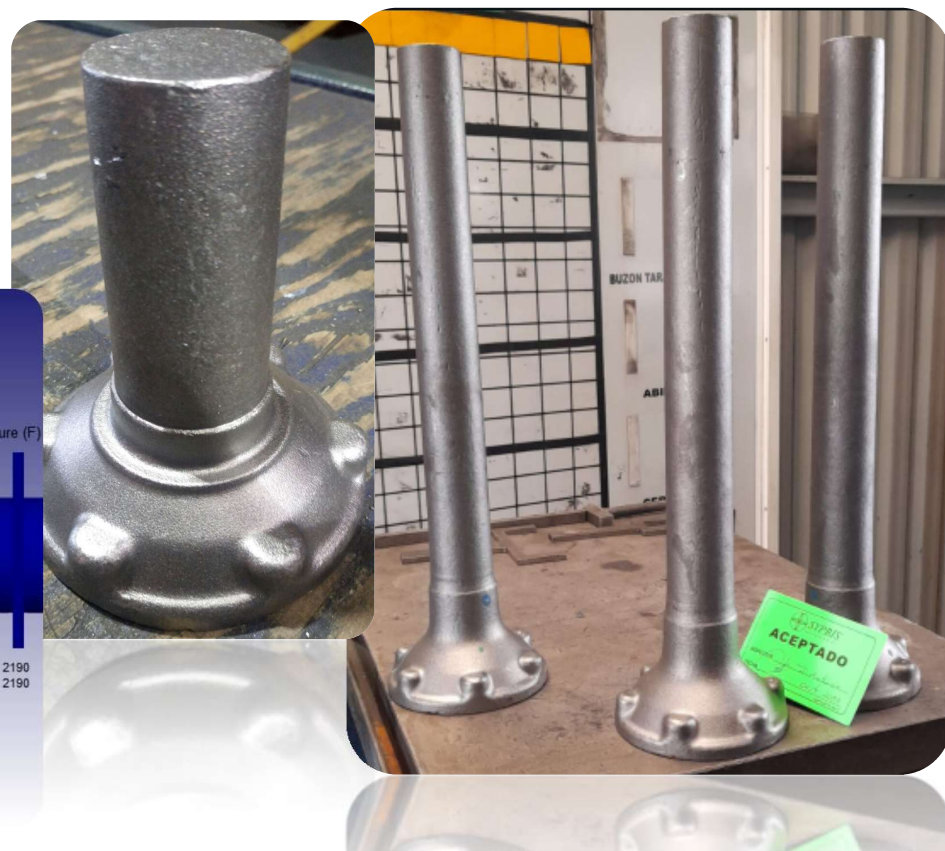
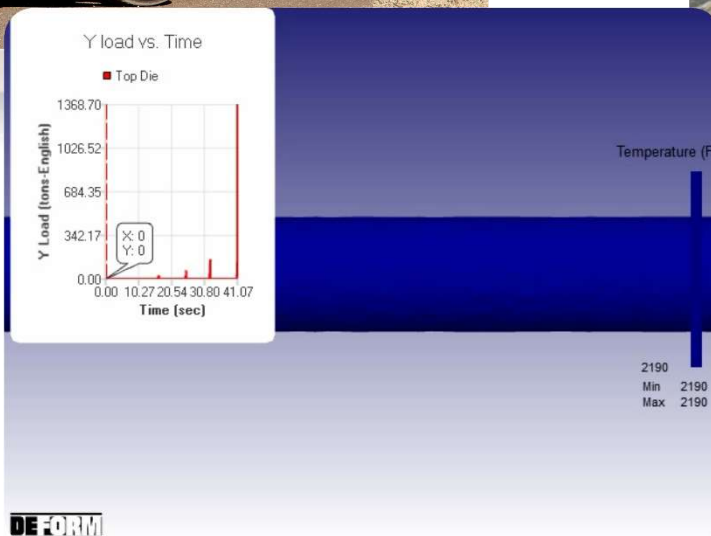
TRANSMISSION SHAFT

- 4 part numbers in upsetter R7 and R6
 - Medium close die concept.
 - 2 parts already integrated with scrap and runout
 - Working on improvements
 - Medium complexity.



TRANSMISSION SHAFTS

- 4 part numbers in press
 - Close die without flash.
 - No issues with the tooling or scrap.
 - High complexity level 4



Upsetters

Forged Products

- Half-shafts
- Pinions
- Trunnions
- Flanges
- Drive shafts
- Input pinions



Especificaciones de Upsetters de 1" a 10"



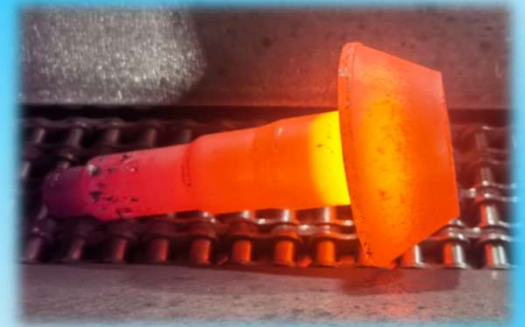
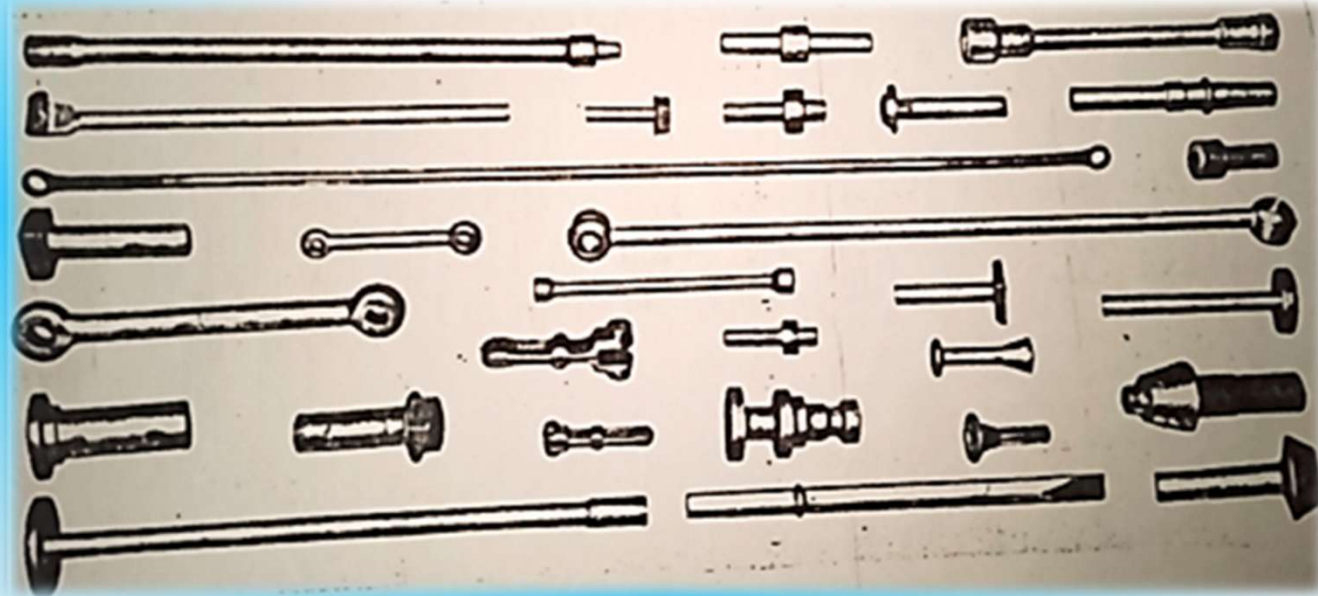
AJAX STANDARD FORGING MACHINES

| MACHINE SIZE | 1" | 1 1/2" | 2" | 2 1/2" | 3" | 4" | 5" | 6" | 7" | 8" | 10" |
|--------------------------|---------|--------|---------|--------|----------|---------|---------|-------|--------|--------|---------|
| RATING IN TONS | 200 | 300 | 400 | 500 | 600 | 800 | 1,000 | 1,200 | 1,500 | 1,800 | 2,250 |
| MAXIMUM DIE CLOSING TONS | 100 | 150 | 248 | 243 | 326 | 366 | 455 | 606 | 995 | 1,300 | 1,800 |
| HEADER SLIDE STROKE | 6" | 8 1/2" | 9" | 10" | 11 1/4" | 13 1/2" | 15 1/2" | 18" | 20" | *24" | 28" |
| STROKES /MINUTE | 90 | 75 | 60 | 55 | 45 | 35 | 30 | 27 | 25 | 23 | 20 |
| DIE OPENING | 2 1/4" | 2 3/4" | 3 1/2" | 4" | 5" | 6" | 7" | 8" | 9 1/2" | 12" | 13 1/4" |
| STOCK GATHER | 3 3/4" | 5 3/4" | 6" | 6 3/4" | 7 1/2" | 9" | 10" | 11" | 13" | 15" | 18" |
| HOLD ON | 2 1/2" | 3 5/8" | 2 1/2" | 3" | 3 1/2" | 4" | 4 1/2" | 5" | 5 1/2" | 6 1/2" | 8 3/8" |
| DIE HEIGHT | 9" | 12" | 14" | 16" | 20" | 26" | 29" | 36" | 39" | 46" | 52" |
| DIE THICKNESS | 5" | 5" | 6" | 6" | 7" | 8" | 8" | 11" | 12" | 13" | 13" |
| DIE SEAT LENGTH | 8" | 10" | 13" | 15" | 18" | 21" | 24" | 26" | 28" | 32" | 36" |
| DIE & TOOL SPACE (MAX) | 20 1/2" | 25" | 28 3/4" | 32" | 40 7/16" | 47" | 51 1/2" | 57" | 64" | 71" | 78 1/4" |

Upsetters de 1" a 10"

- Forged Products

- Half-shafts
- Pinions
- Trunnions
- Flanges
- Drive shafts
- Input pinions



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DESIGN OF FLEXIBLE FORGING LINES

Flexible Forging Lines

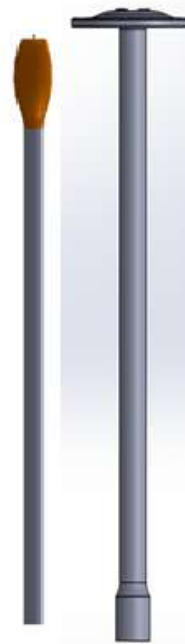
- Advanced technology for hot and warm forging processes
- Significant improvement in product quality
- Enables development of long axle shafts
- Facilitates development of transmission shafts
- Allows manufacturing of pinions
- Supports development of hollow shafts or spindles
- Enables forging of gears

Design of Flexible Forging Lines for Axle Shafts, Spindles, and Gears

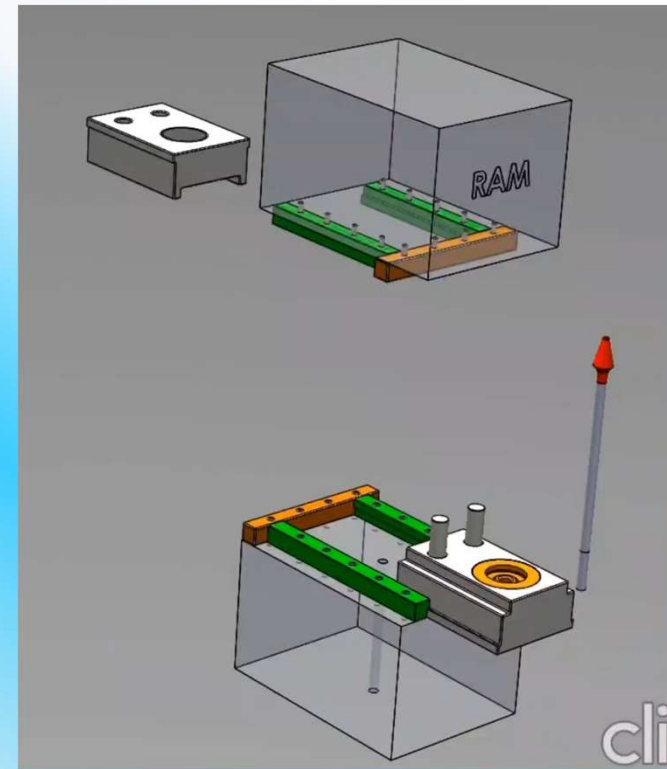
Preforms using hydraulic press



Final piece use screw press



Design of Flexible Forging Lines and Tooling, Using the Concept of Slide Dies and Punches



Mechanical and Hydraulic Presses for Forging Processes

- **Forged Products**

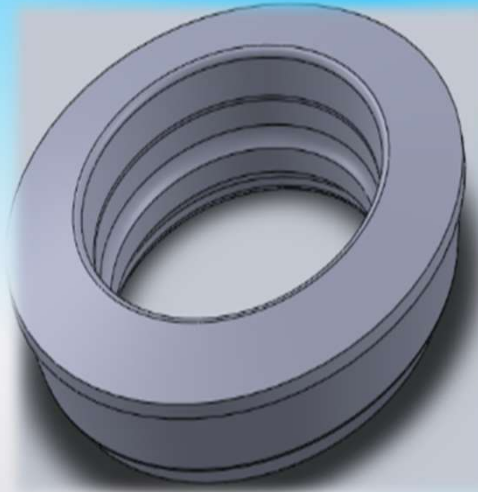
- Gears
- Ring gears
- Input components
- Pinions
- Yokes
- Flanges



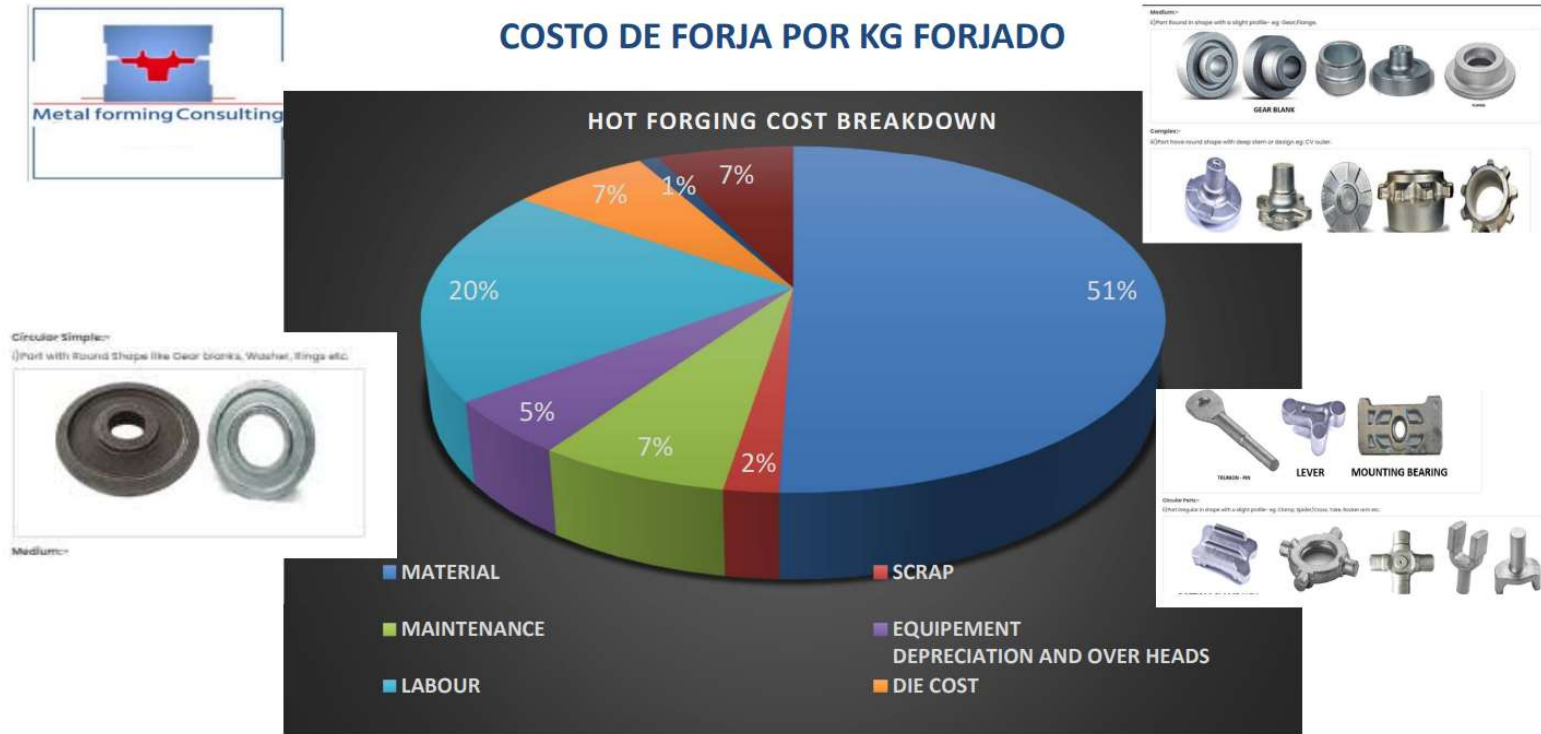
Hammer Forging Systems

- **Forged Products**

- Gears
- Ring gears
- Yokes
- Flanges
- Valves
- Crankshafts



Typical hot forging cost breakdown



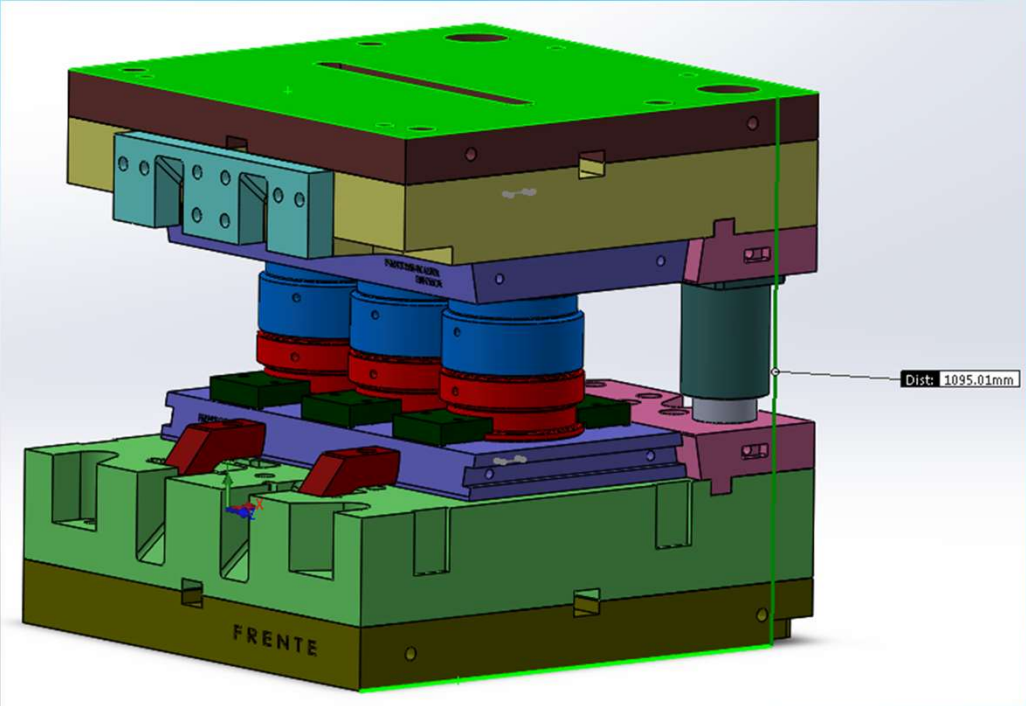
Estudio realizado por Peugeot en colaboración con Sumitomo y Thyssenkrupp en el año 2012

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- Pioneer in Mexico in the development of die sets with cassette-type systems to enable model
- changeovers in under 10 minutes, ensuring both quality and safety.
- Tooling design with advanced technologies and steel selection to ensure longer tool life, incorporating
- quick-change die set systems for presses in under 10 minutes.

Implementation of New Technologies in Die Set Design with SMED Approach (Quick Changeovers in Presses)



Thank you

ORGANIZATIONAL CHART

Work Model and General Presentation – March 2025

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