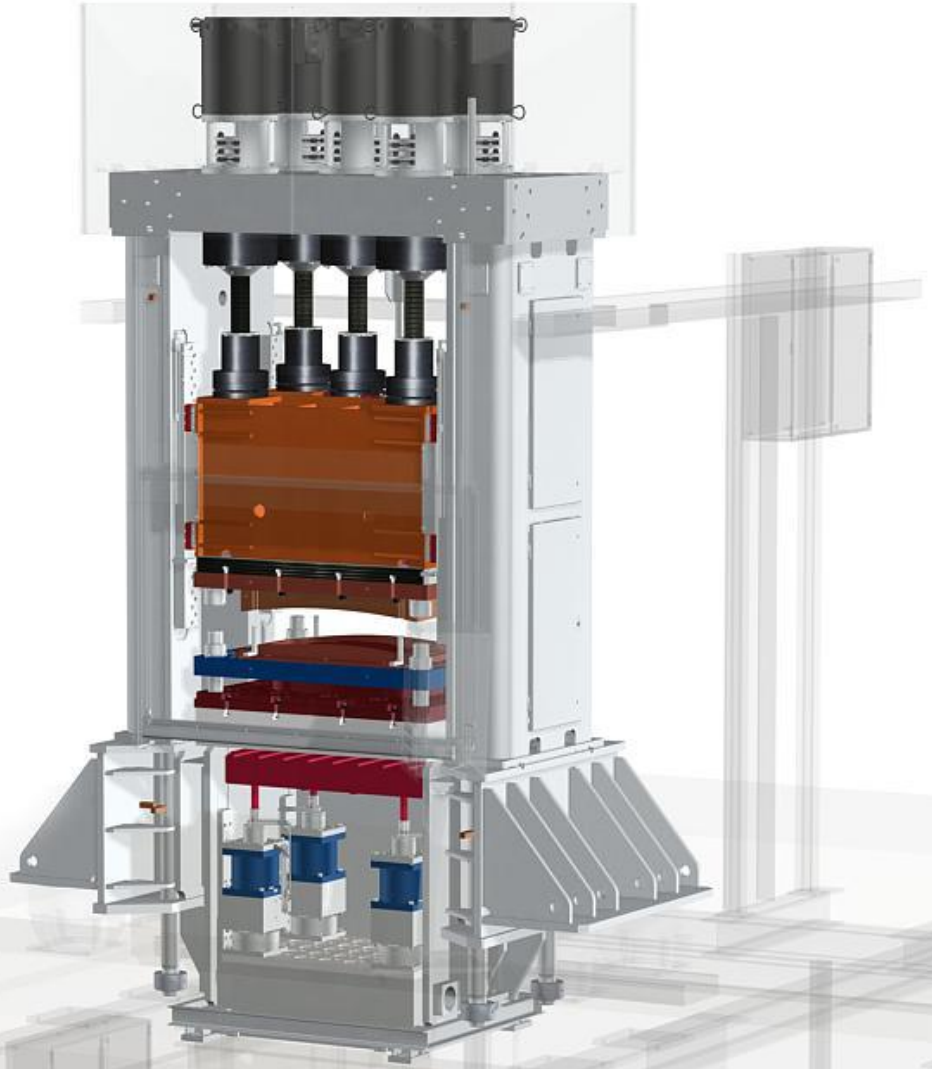
TRÜ Servo™ Press: The Ability to Pass the Drawing Ratio

Kevin Fernandes, President – Macrodyne Technologies Inc.



GDIS

Extreme Precision, Productivity and Reliability

Leveraging direct servo-driven screw mechanics and proprietary **Deepest Draw™** software, the **TRÜ Drive™** system delivers a groundbreaking advancement in deep drawing technology.

- Enables manufacturers to exceed conventional drawing ratio limits, achieving depths up to 80% deeper than traditional methods.
- TRÜ Servo™ Press, with its customizable direct-drive, provides 100% controllable force throughout the stroke, enabling precise material flow and enhanced process flexibility.
- Proven reliability in Europe

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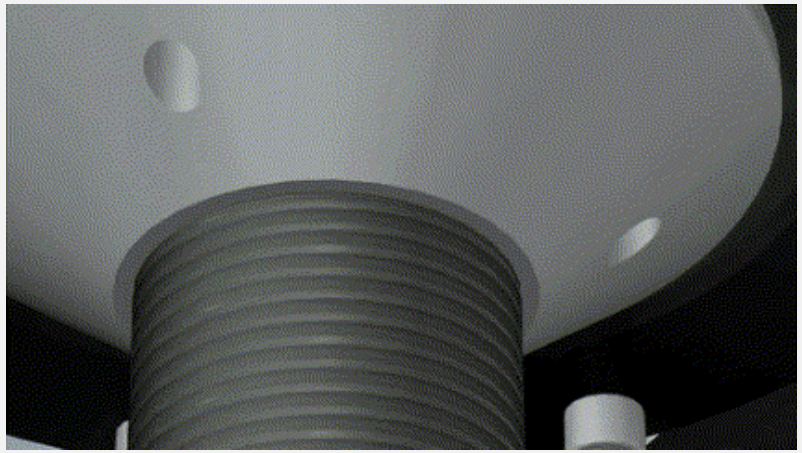
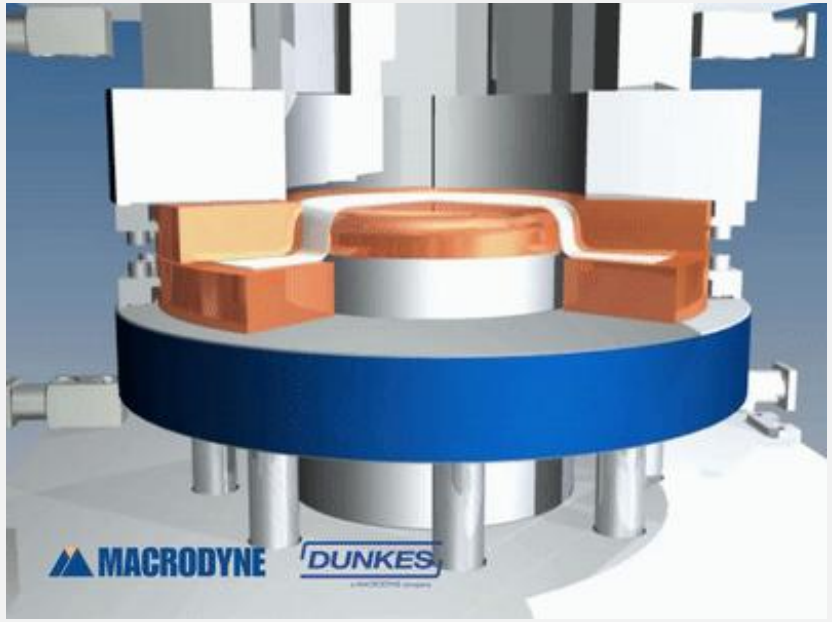
Key Benefits: Electro-Mechanical TRÜ Servo™ Presses



- Increased drawing depth and faster process speeds.
- Lower energy consumption and no lubrication needed.
- Clean-room and Industry 4.0 ready
- Smoother, cleaner operation with minimal maintenance.
- Versatility with servo-controlled motion options (digitally-controlled).
- Energy-efficient, quiet operation with reduced noise pollution.

Electro-Mechanical TRÜ Servo™ Presses

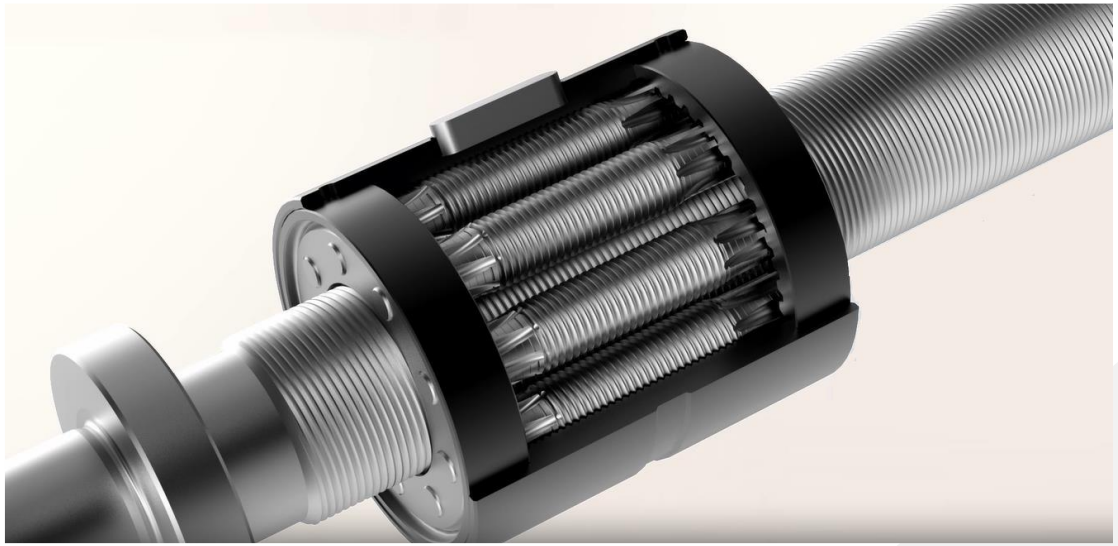


- Variable Motion, force, and speed profiles for the ram and drawing cushions, each over the entire stroke range
- Synchronization of the ram and die cushion movements with the option of pre-acceleration of the respective movements
- Rigid, fast and highly dynamic drive elements and controls circuits
- High-resolution sensors with max sampling/transmission rates (µs/µm)
- Rigid machine body
- Zero-play guiding elements for the ram
- Rigid and direct force transmission
- Efficient energy management

GDIS

Planetary Roller Screws

Electromechanical linear drives using Planetary Roller Screws are the best solution when high precision, accurate repeatability and high-load capacity are required. The axial load is transmitted by the threaded spindle via the threaded planets into the threaded nut.
The system is synchronized through gears on the planets and via two gear rings.



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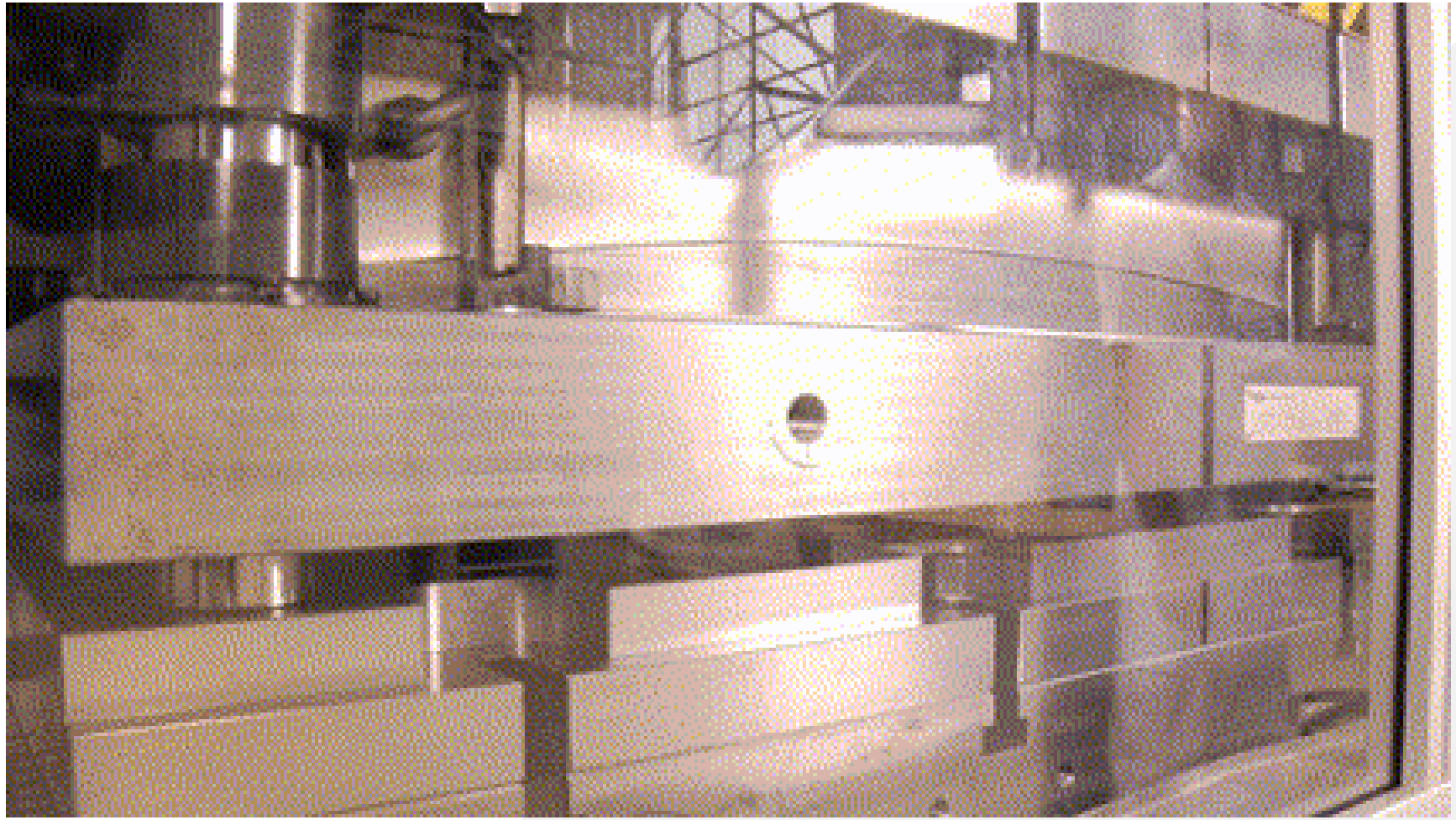
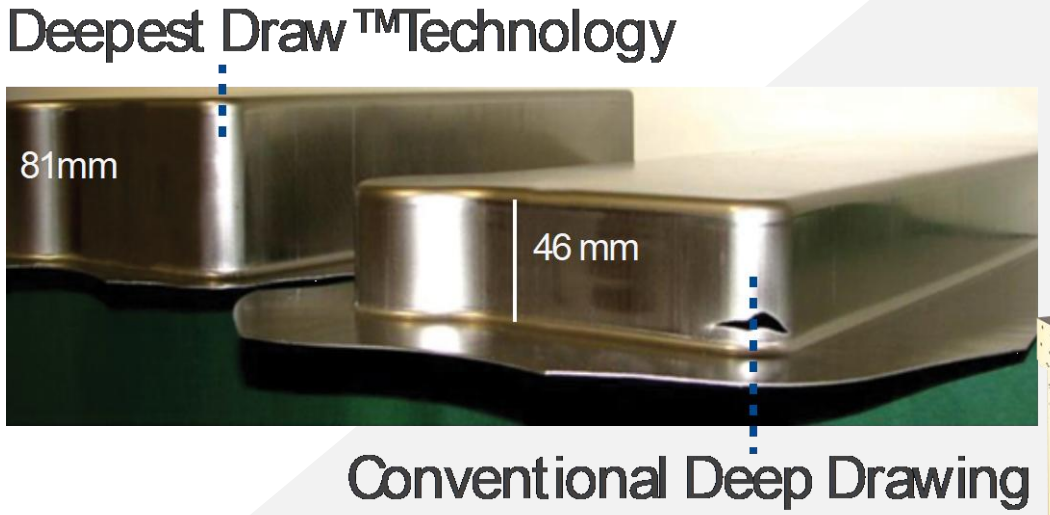
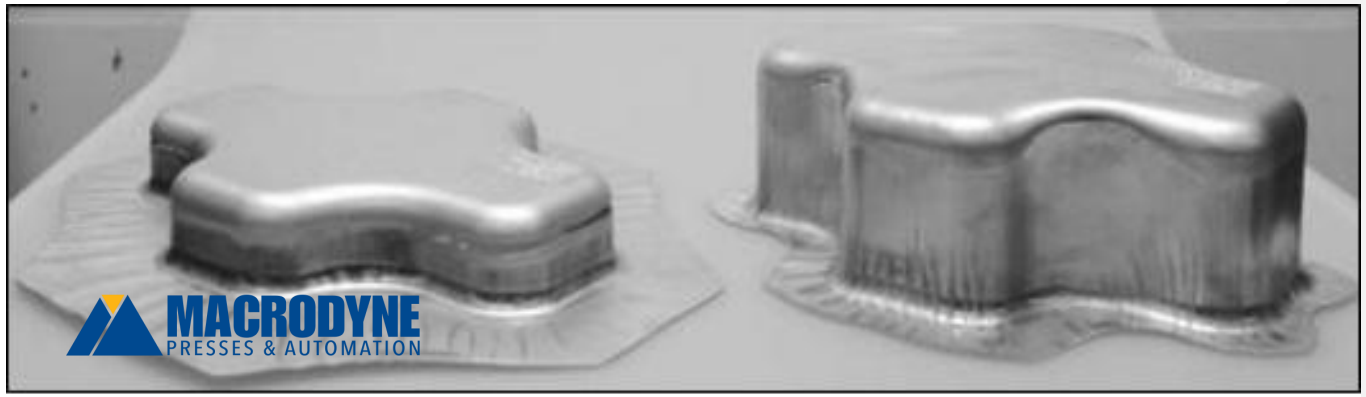
Synchronization of the Ram and Die Cushion Movements

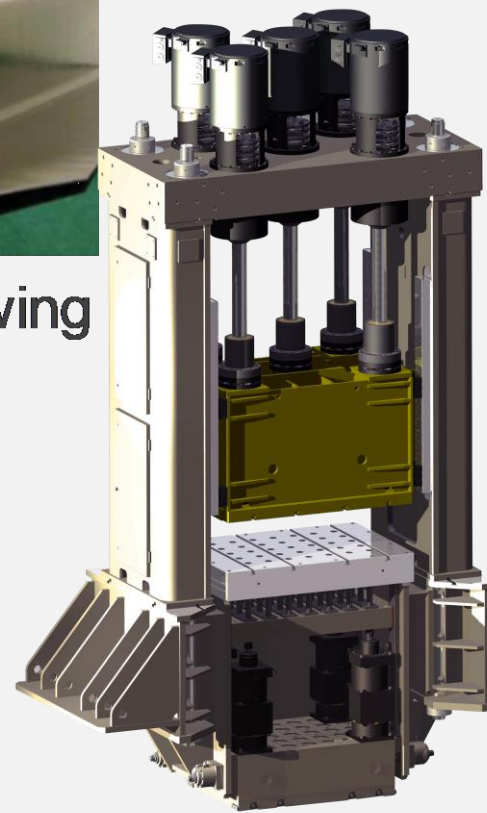


Optimize Deep Drawing with Servo-Controlled Synchronized Cushion-Ram Motion

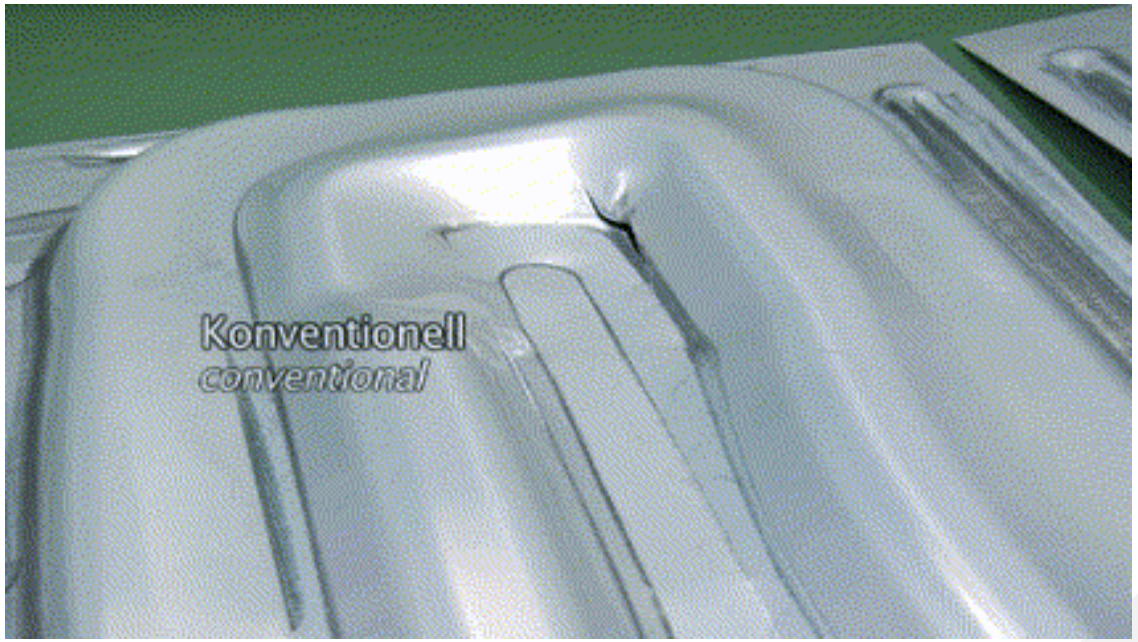
The synchronized coordination of the ram and cushion motion enables precise control of the distance between the action zones. This capability optimizes the workspace, particularly in deep drawing applications. As a result, the forming limits are extended and process reliability is significantly improved.

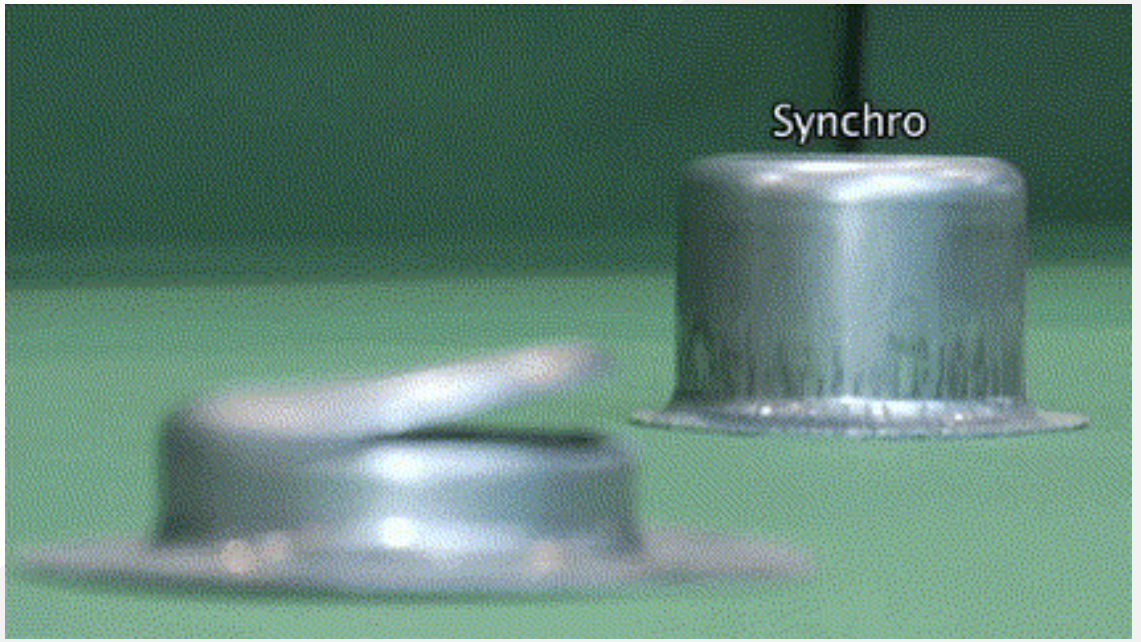




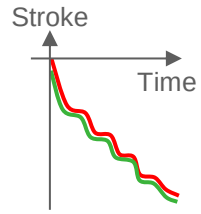


Conventional Vs. Deepest Draw Technology (Synchro)

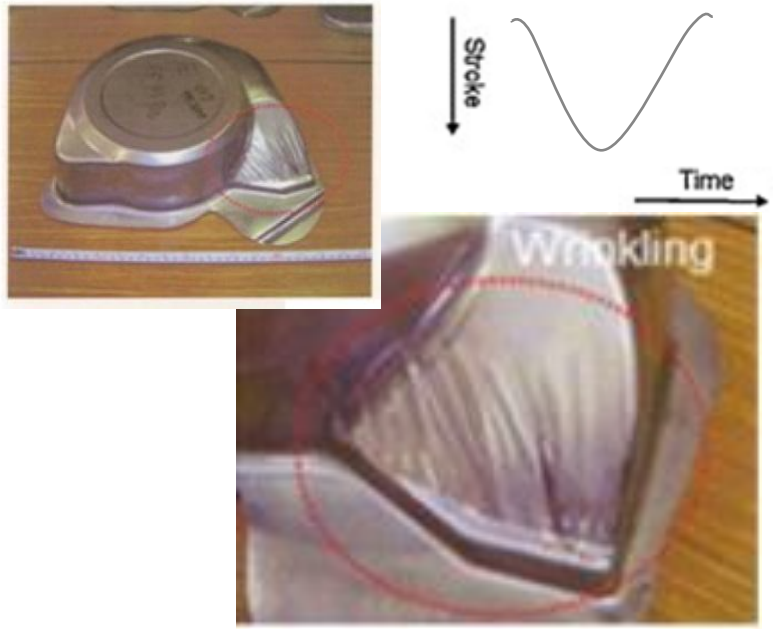




Electro-Mechanical TRÜ Servo™ Presses: Technology

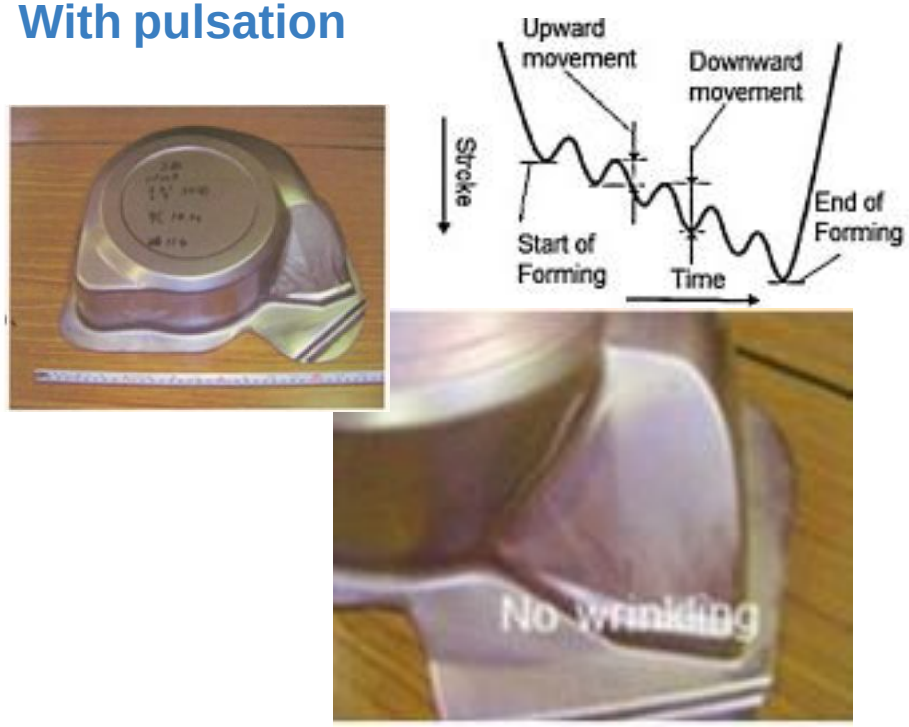


Standard



Normal motion

With pulsation



Stepwise motion

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I. Komatsu and Murakami, Practical Use of Servo Press, The Nikkan Kogyo Shimbun, Ltd (2009) pp. 48–49 (in Japanese).

Electro-Mechanical TRÜ Servo™ Presses: Technology

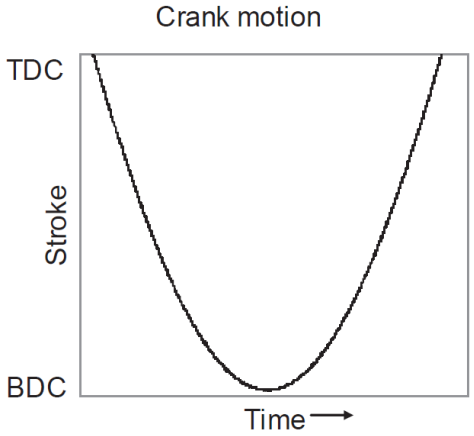


Figure 4 ; Motion Profile of crank motion.

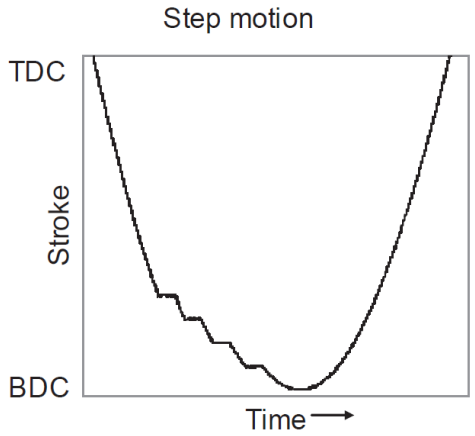
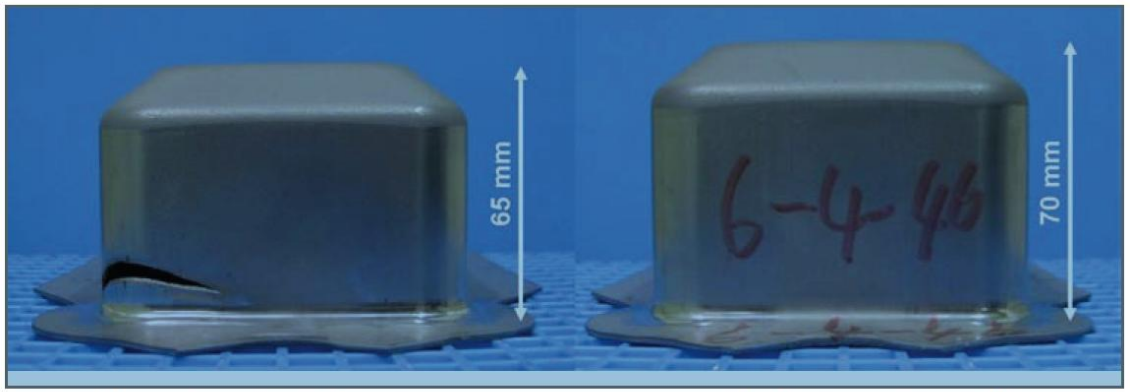


Figure 5 ; Motion profile of step motion

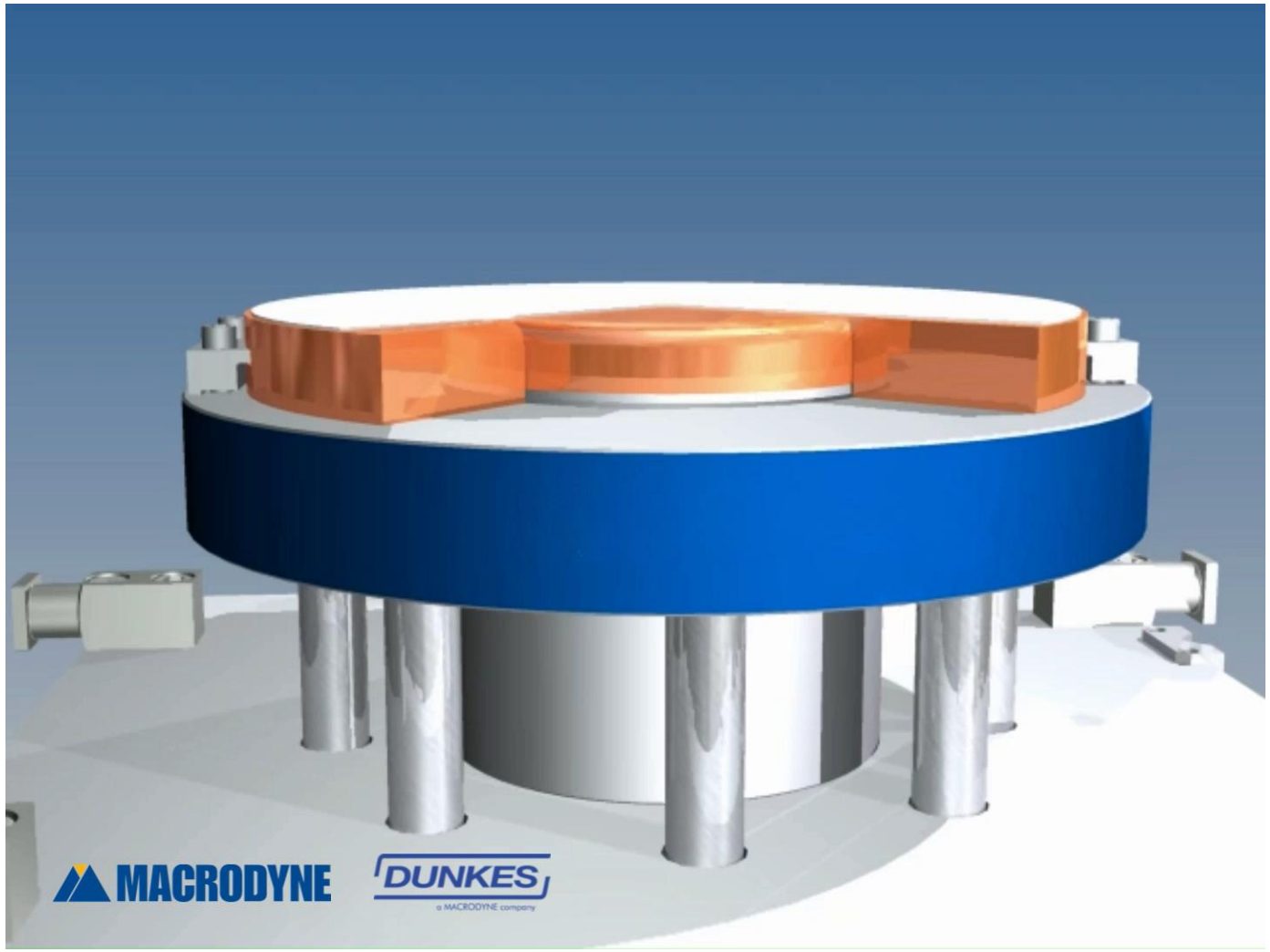


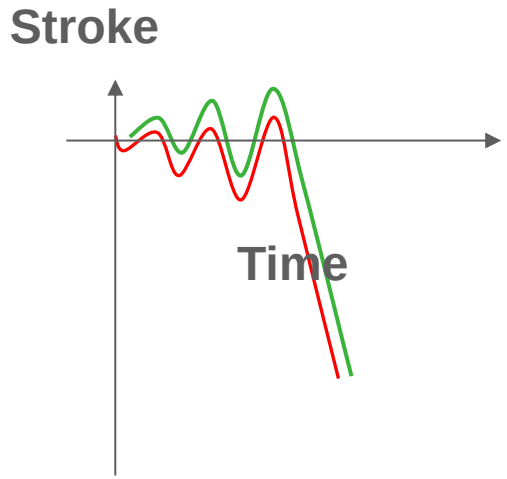
(a) By crank motion (65 mm)

(b) By step motion (70 mm)

Research in Deep-Draw Forming of High-Strength Steel Sheet Using a NC Servo Press Machine; H. Yamashita* et all; IDDRG 2010

Technology: BDD - Bi-Directional Drawing for stainless steel, HSS (steep flowcurve)

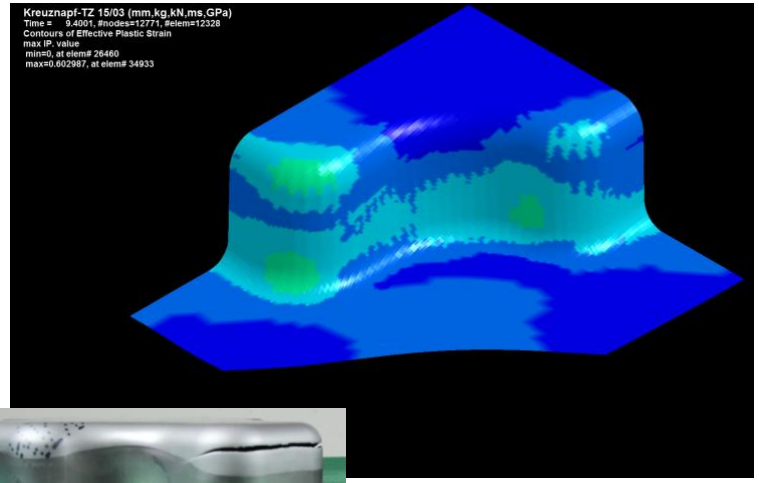


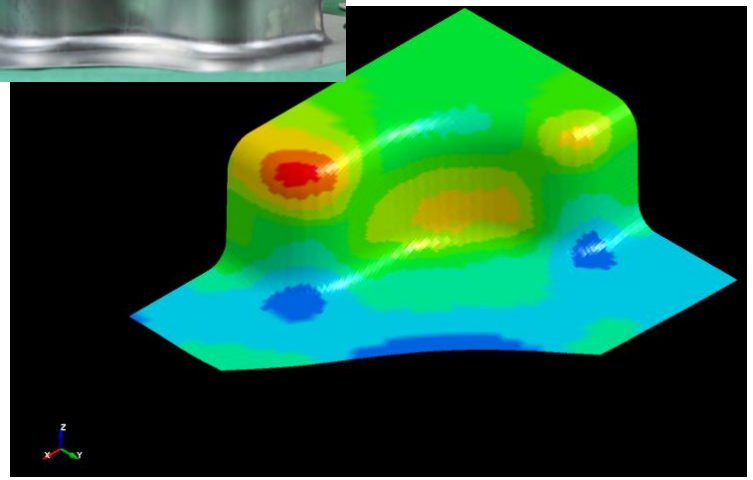


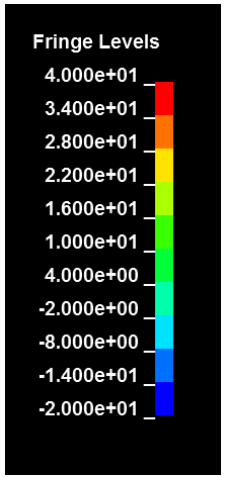
Technology: BDD - Bi-Directional Drawing for stainless steel, HSS (steep flowcurve)

Simulation BDD

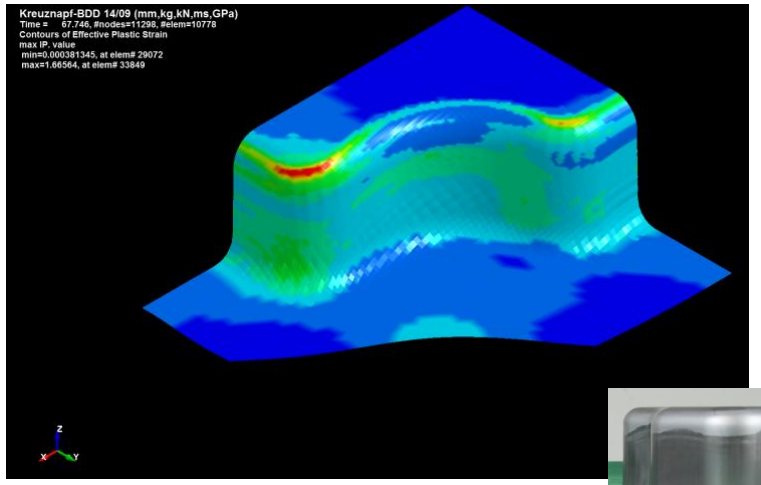
Deep drawing 46mm

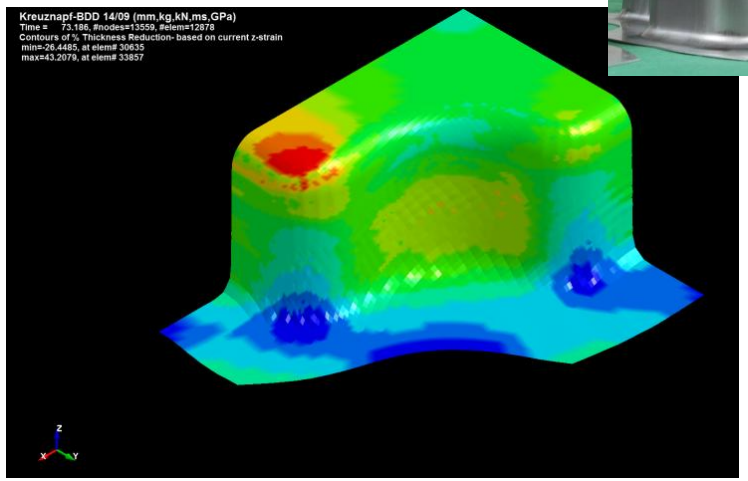




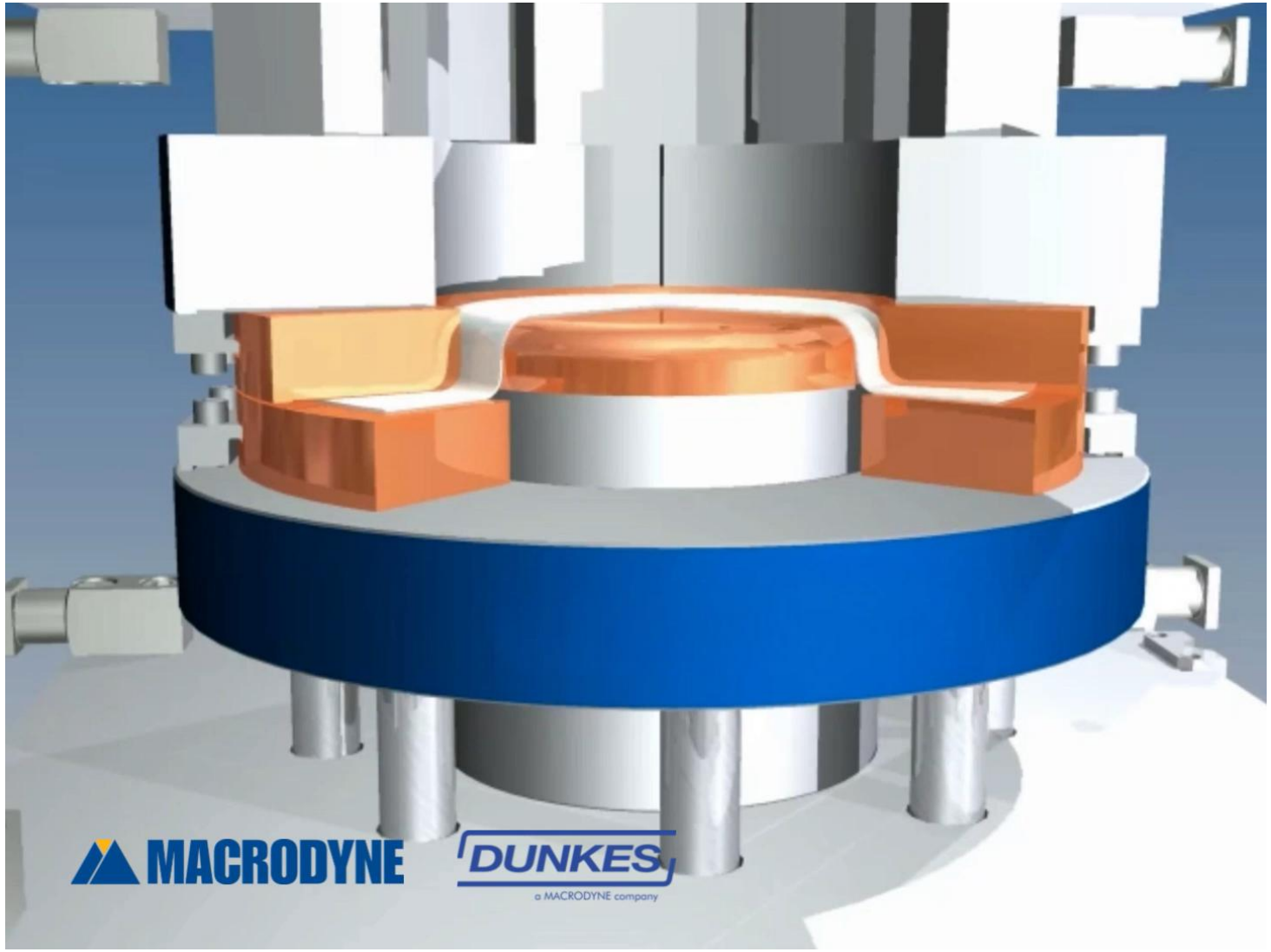


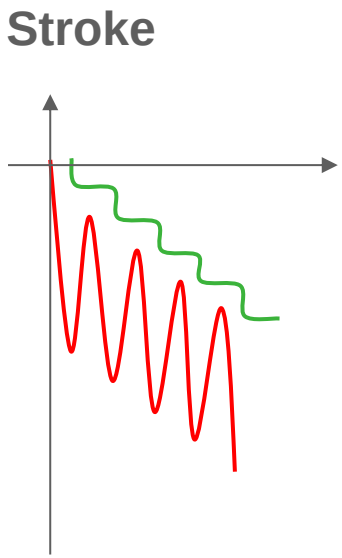
BDD 60mm





Technology: CRP - Cushion-Ram-Pulsation for mild steel, aluminium (flat flowcurve)





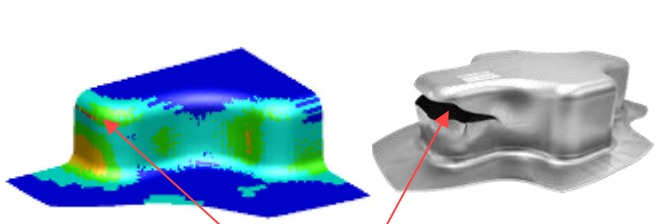
Technology: CRP - Cushion-Ram-Pulsation for mild steel, aluminium (flat flowcurve)

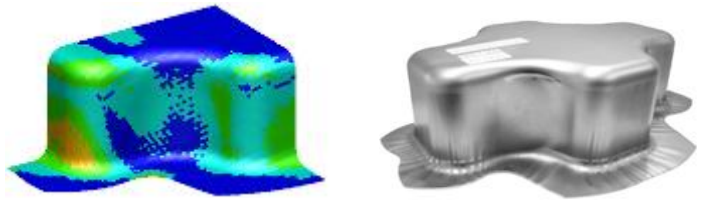
Simulation CRP

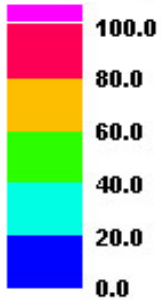
FE-Analysis
Steel DC01

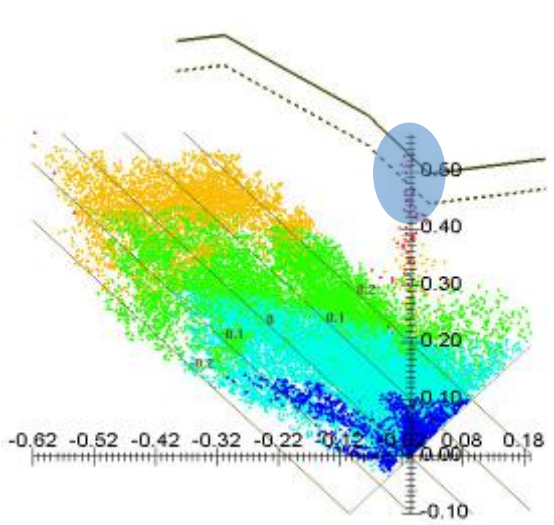
Deep Drawing

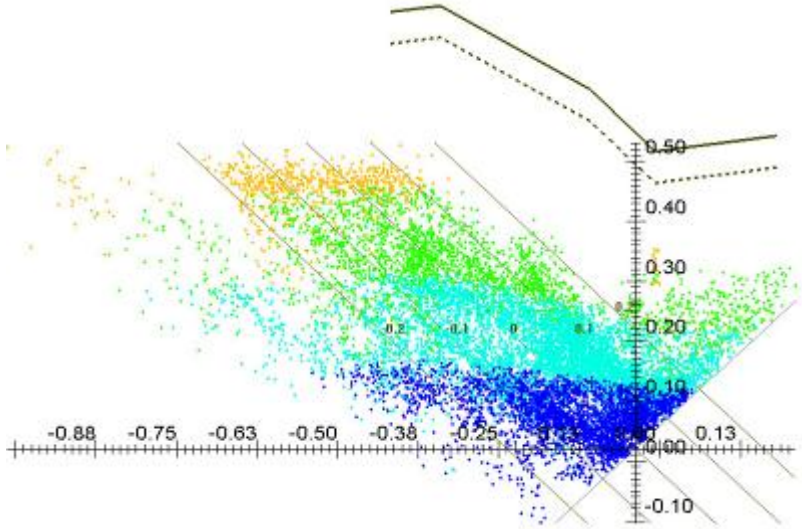
CRP



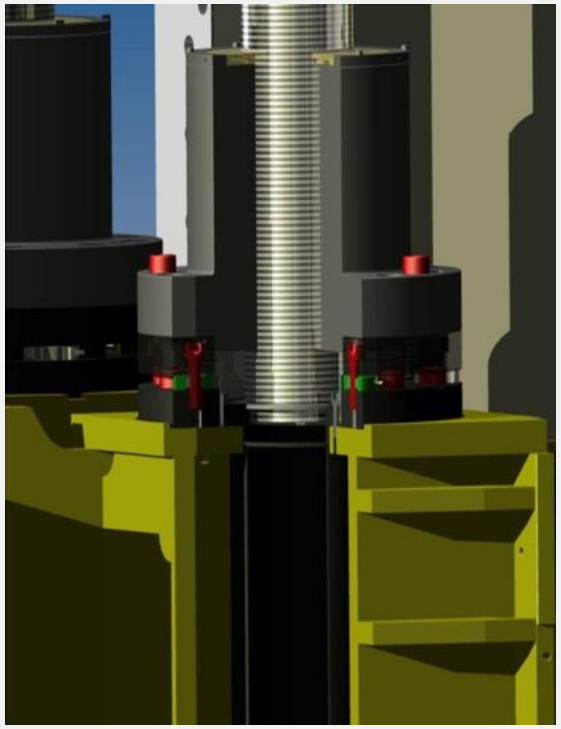








Electro-Mechanical TRÜ Servo™ Presses



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Electro-Mechanical Servo Direct Drive Ram Axis

- 5 Axes (4 axes ram/1 axis hold-down device)
  Consists of:
    - Torque motor Pmax. 39 kW, water-cooled
    - Rigid, backlash-free (torsionally rigid) coupling
    - Roller screw drive with necessary axial and radial bearings

Technical Data:

F = 400kN; Hub=700mm; Vs=280mm/s; Vp=50mm/s

Features:

- Max. force over entire stroke
- Arbitrary force and movement profiles
- Easily reversible
- High Efficiency

GDIS

Precision Pressing with Power and Speed

Ram Force:	4,000 tons
Pressing Speed:	280 mm/s for fast and efficient operations
Cushion Force:	Up to 1,000 tons
Tool Area:	Completely customizable
Stroke:	Up to 20 ft.
Bed Size:	20 ft. x 12 ft.
High Frequency:	Operates at 15 Hz with a 0.5mm stroke for rapid cycles
Mold Height:	Min. 325 mm for flexible tooling setup

Example of a 1-drive system | Example of a 2-drive system | Example of a 5-drive system

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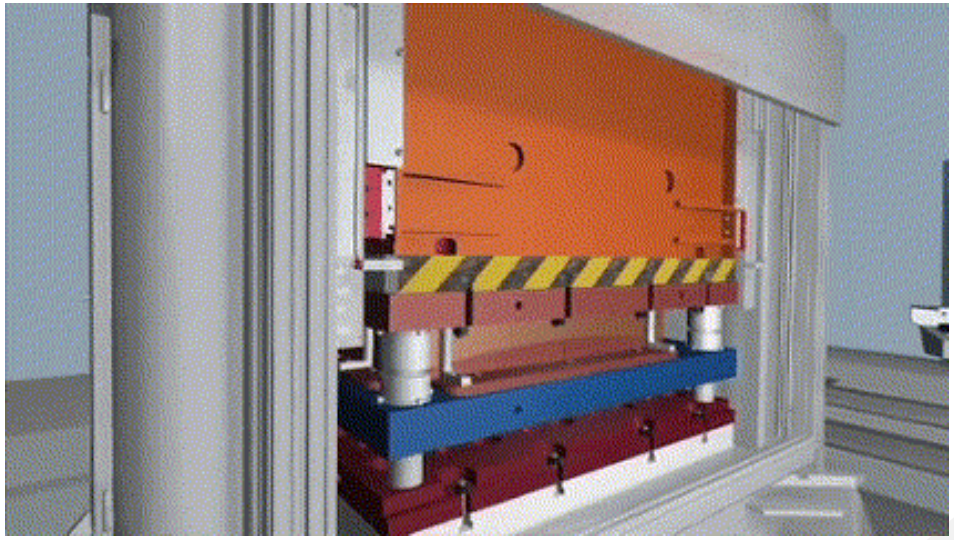
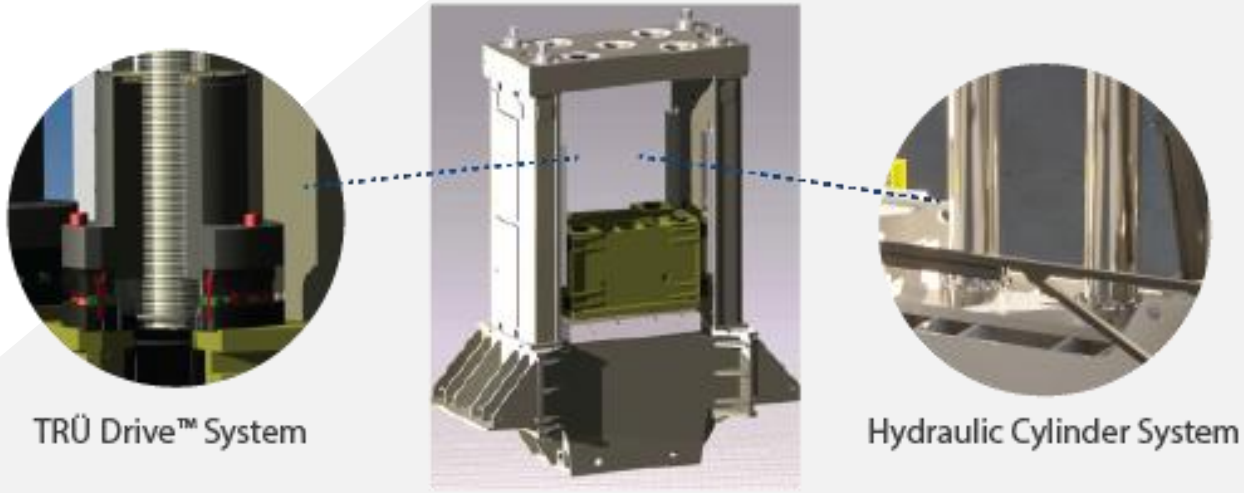
Any Standard Press Frame Can Have a TRÜ Drive™ System or Traditional Hydraulic Cylinder System

Our industrial servo drive systems integrate with any press frame, and virtually any Macrodyne press can be equipped with a TRÜ Drive™ System, offering unmatched adaptability for real manufacturing environments.





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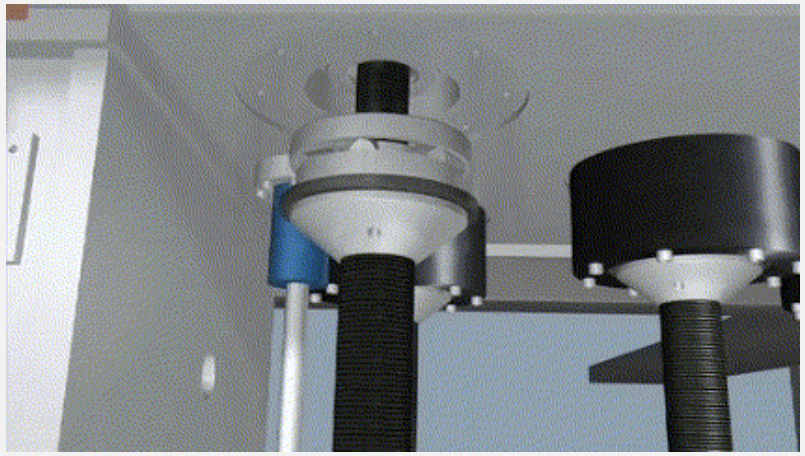
PRESSES & AUTOMATION

Versatile Applications for Precision Manufacturing



Scan the QR Code to watch the technology video for the TRÜ Servo™ Press

The TRÜ Servo™ Press is designed to handle a variety of manufacturing processes, delivering precise and reliable performance across multiple applications and industries.

- Deep drawing
- Metalforming
- Stamping and blanking
- Cold forging
- Compression Molding
- Compaction
- Extrusion
- Stretch forming
- Superplastic forming
- Die spotting
- Many others

Thank you!

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