JAPAN FORMING MACHINERY ASSOCIATION

Our Vision for the Forming Machine Industry

The ideal shape for the industry in 10 years

Industry Vision

Enhancing International Competitiveness
Achieving eco-friendly products that benefit both people and the environment

Fostering a growth cycle for the industry

Ensure profit ⇒ Reinvest in technology, equipment, human resources ⇒ Market differentiation ⇒ Enhanced international competitiveness

October 2006

Japan Forming Machine Association

Table of Contents

An analysis of the forming machine industry as it is today and where it needs to go from here to fulfill its potential!!

An industry performing at full potential in 10 years!!

10 years from now

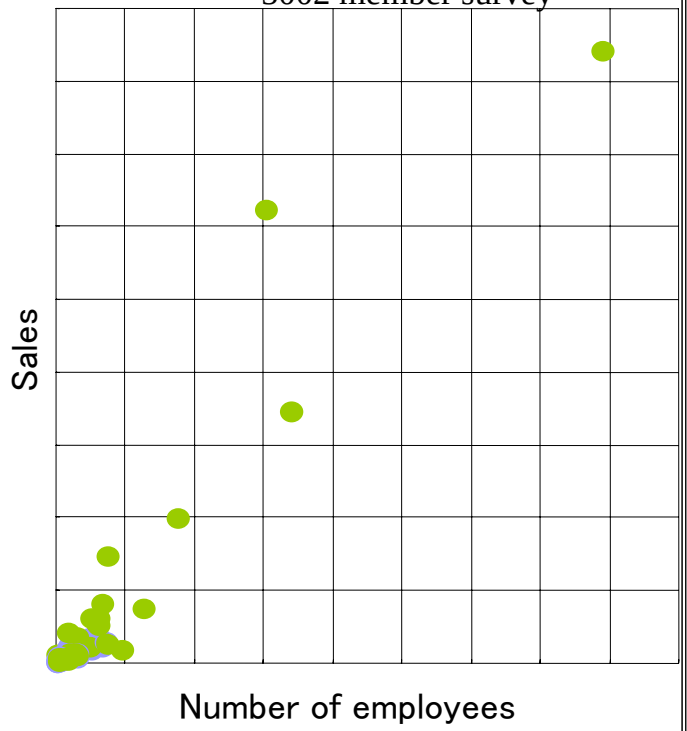
The undisputed industry leader worldwide

P･2 NEXT: Chap. 1

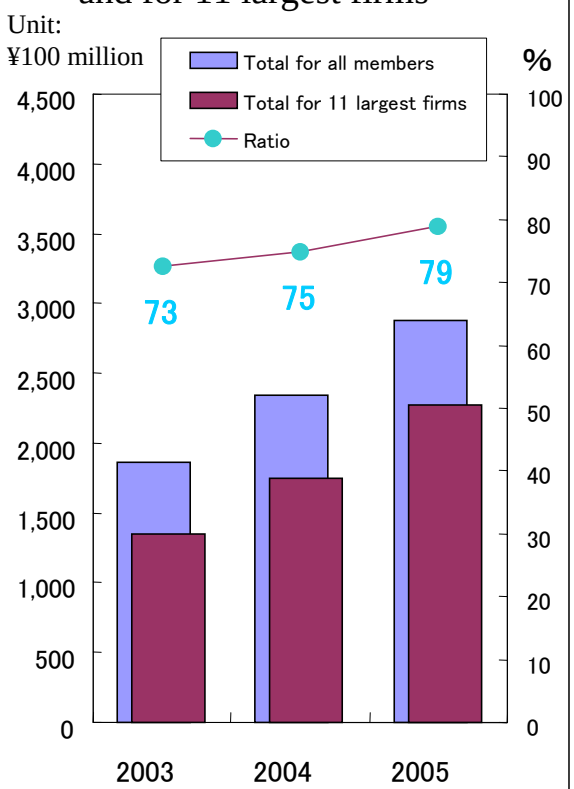
Chapter 1: An analysis of the forming machine industry today

Forming machinery: member enterprises and range and numbers of machines produced

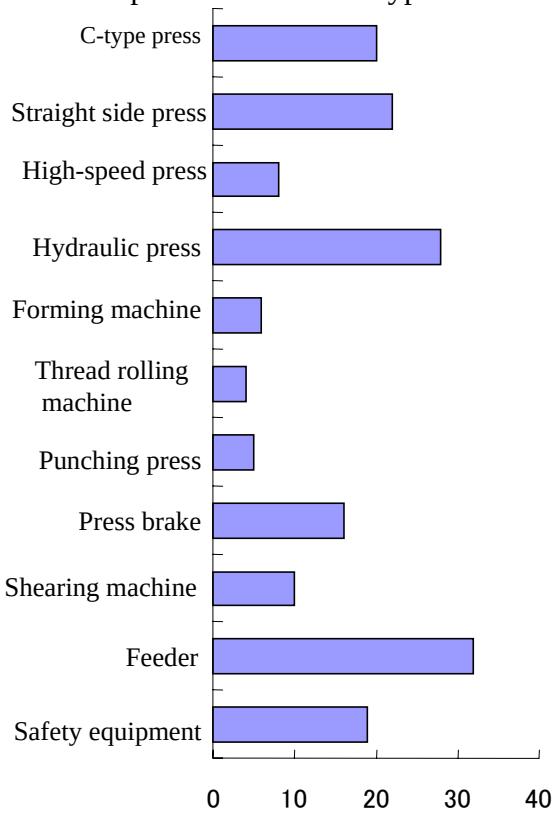
Enterprises in the forming machine division
Distribution of sales and employee numbers
5002 member survey



Total revenue for all members and for 11 largest firms



Number of firms manufacturing particular machine types



1. JFMA consists of 62 members. Around 10 members are large firms with the remainder being medium and small enterprises. The 11 largest firms account for about 80% of total order revenue but have limited areas of expertise, while the medium and small firms have expertise in custom machines for specific customers and produce specialized, automated, and safety-focused equipment incorporating novel technologies.

P·4 NEXT: The industry's main products

The industry's main products

Press-type forming machinery: machine press, forging machine, hydraulic press, automated equipment

Sheet metal forming machines

- Punching press
- Press break
- Shearing machine
- Bending machine
- Other

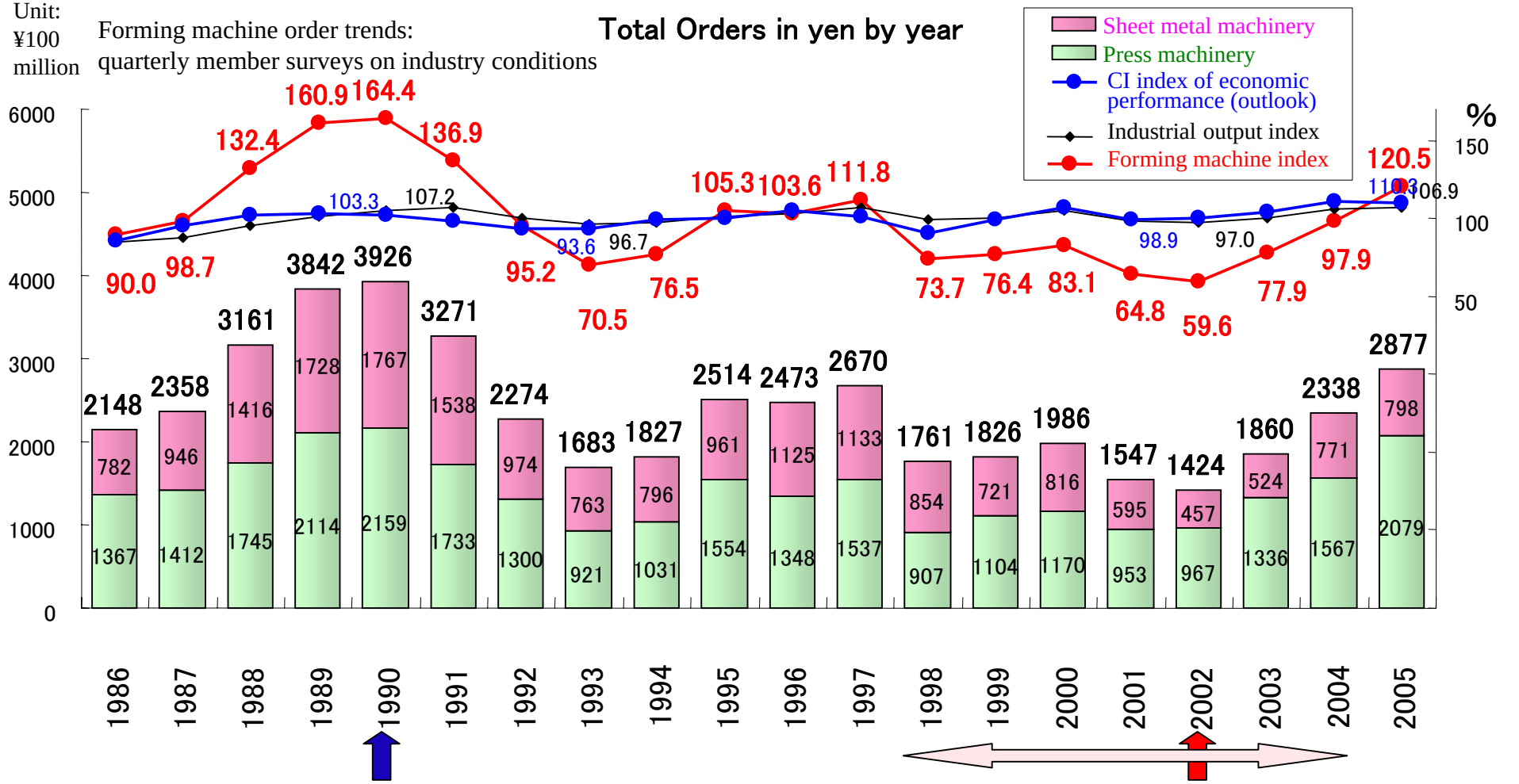
P·5 NEXT: Industry machine order trends

Forming machine order trends: member survey on industry conditions

Press machinery is defined as encompassing machine presses, forging machines, hydraulic presses, and automated equipment. Sheet metal machinery is defined as punching presses, press breaks, shearing machines, bending machines and others.

Unit: ¥100 million

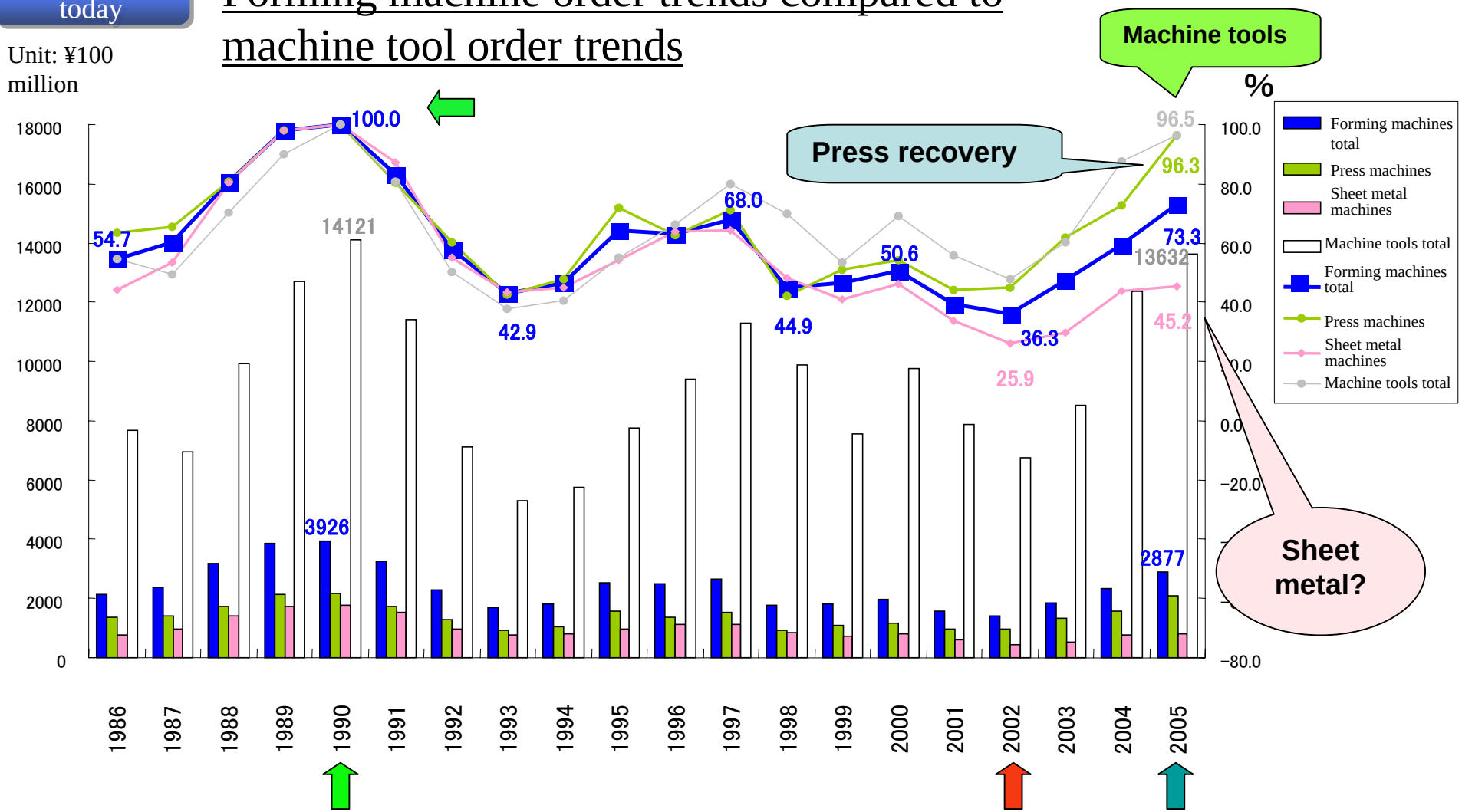
Forming machine order trends: quarterly member surveys on industry conditions



1. Forming machine orders fluctuate about five times as widely as the economic performance index, the industrial output index, and machine industry infrastructure investment. The 20-year average declined over the last few years but finally moved upward in 2005.

P·6 NEXT: Machine tool order trends and comparison

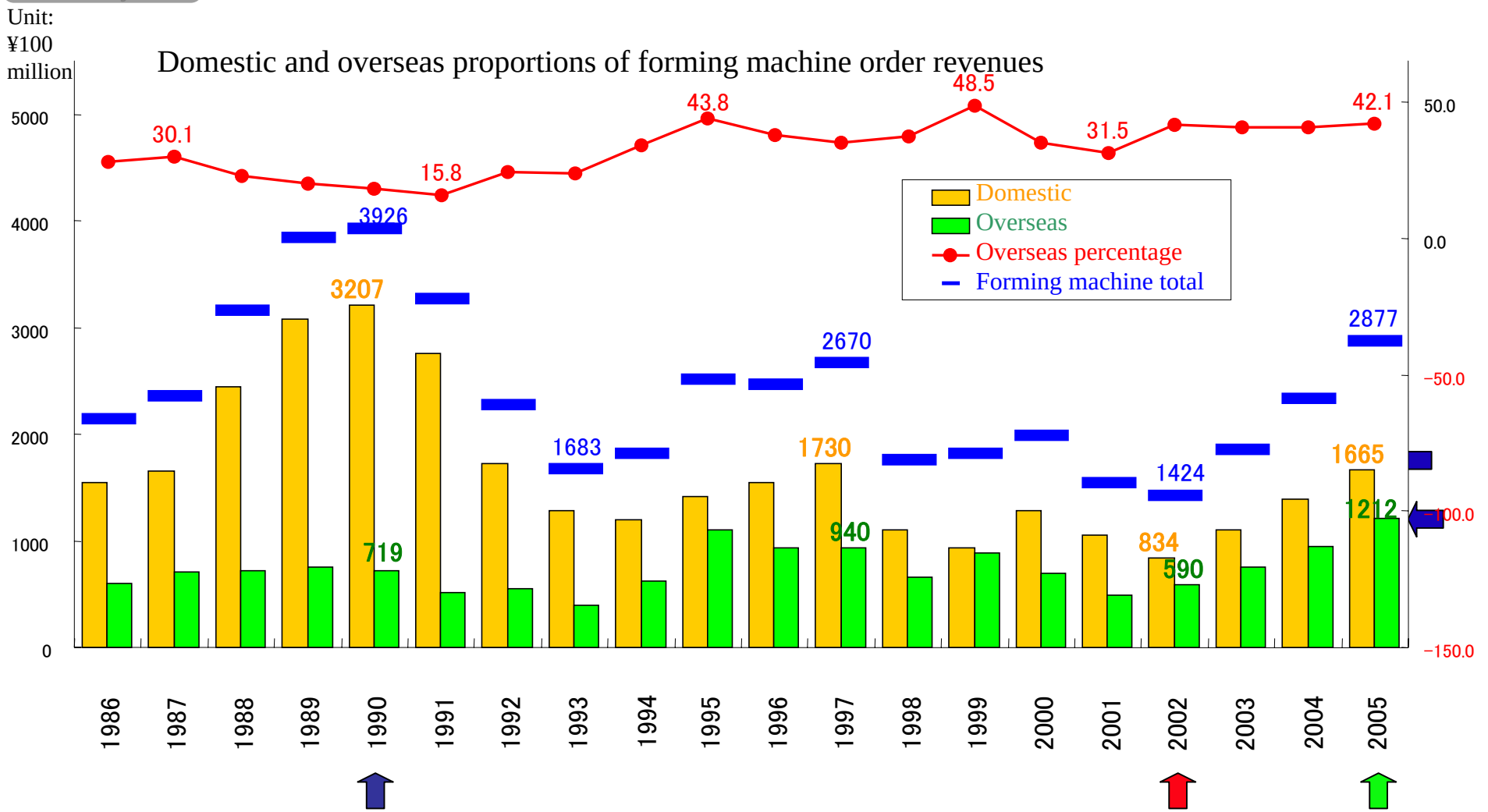
Forming machine order trends compared to machine tool order trends



1. The machine tool industry recovered to a level close to its 1990 bubble era peak in 2005 (96.5%) and exceeded bubble era performance in 2006, whereas the forming machine industry was still only at 73.3% of its bubble era peak.
2. Like the machine tool industry, the press machine sector of the forming machine industry has recovered. On the other hand, the sheet metal machine sector is at 45.2%, less than half the bubble era peak. The primary factor in this is thought to be the push by the machine tool industry to promote laser technology.

P·7 NEXT: Order trends: domestic and international comparison

Forming machine order trends: domestic and overseas

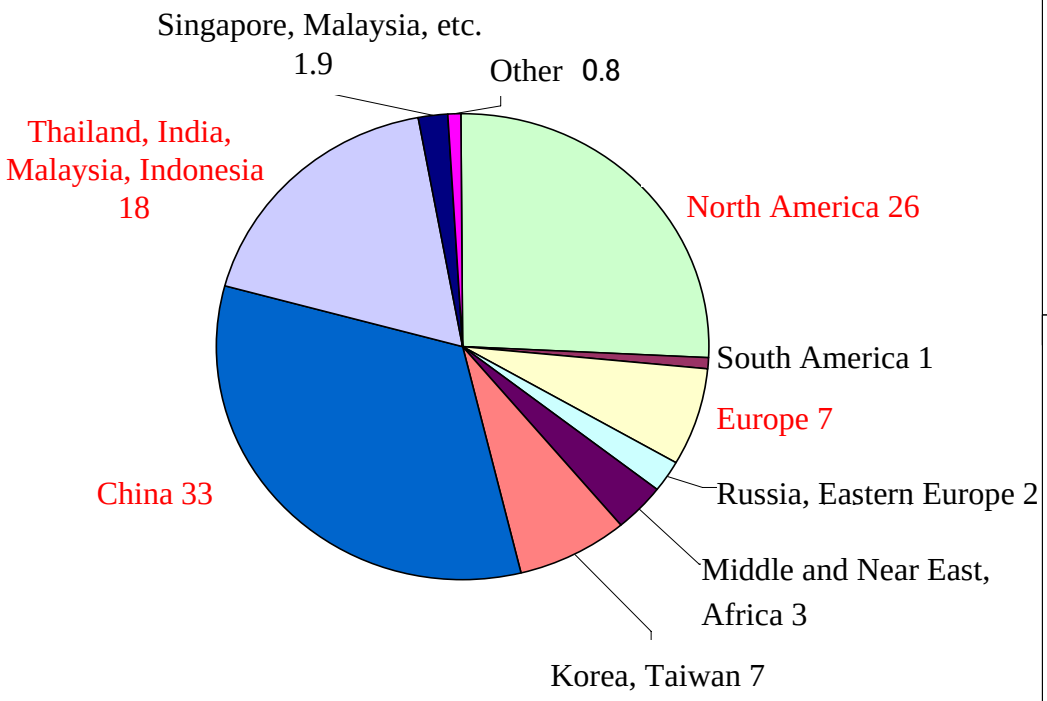


1. Domestic orders dropped to 1/4 the level of the 1990 peak, as a result of manufacturers moving overseas due to the rising yen and labor costs. By 2005, orders had recovered to more than 50% of their 1990 bubble era peak, but we do not anticipate significant growth beyond this level.
2. Overseas orders recorded their highest level ever in 2005, 1.7 times greater than in 1990. Overseas orders are expected to continue growing, which will require stronger international competitiveness.

P·8 NEXT: Analysis of overseas orders

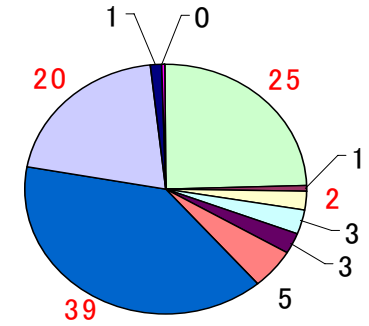
Forming machine overseas order trends

Overseas exports by country 2005



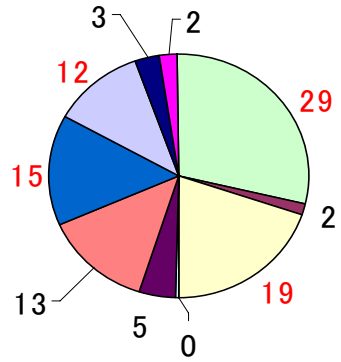
Press machinery

China and SE Asia account for 60% of exports



Sheet metal machinery

North America and Europe account for 50% of exports

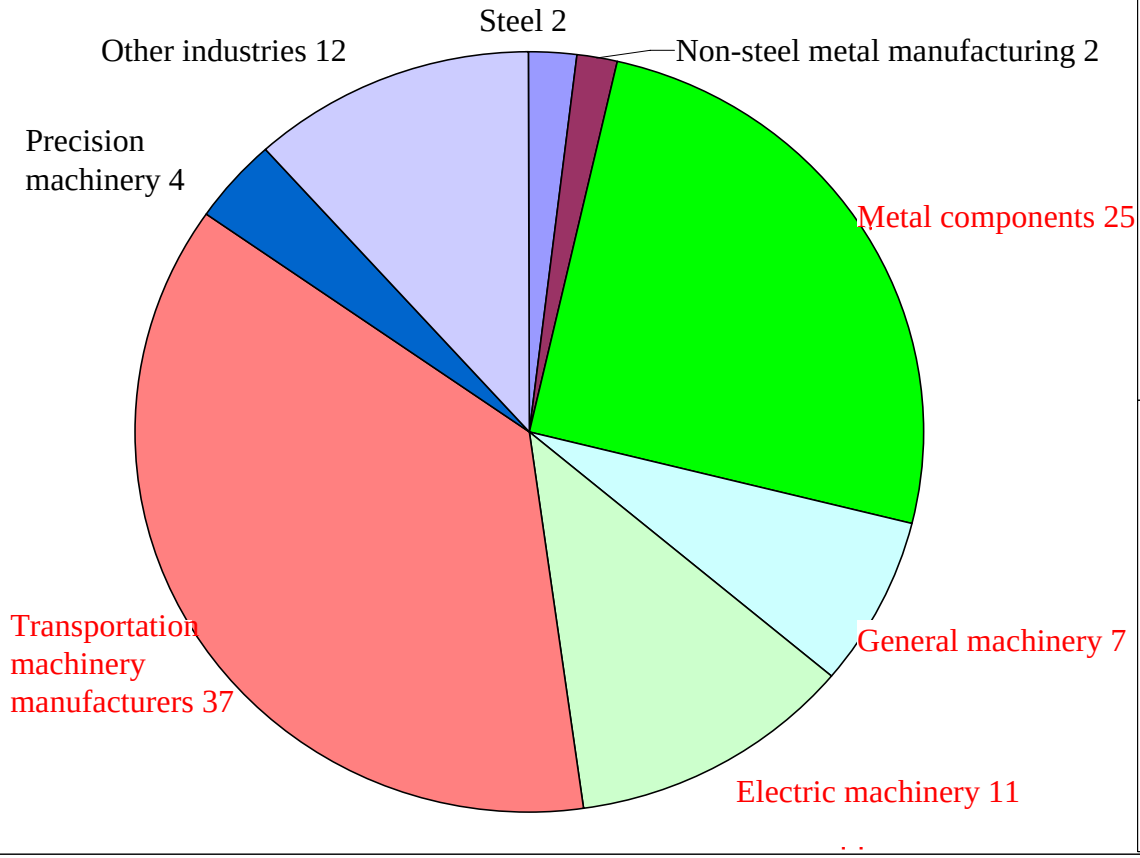


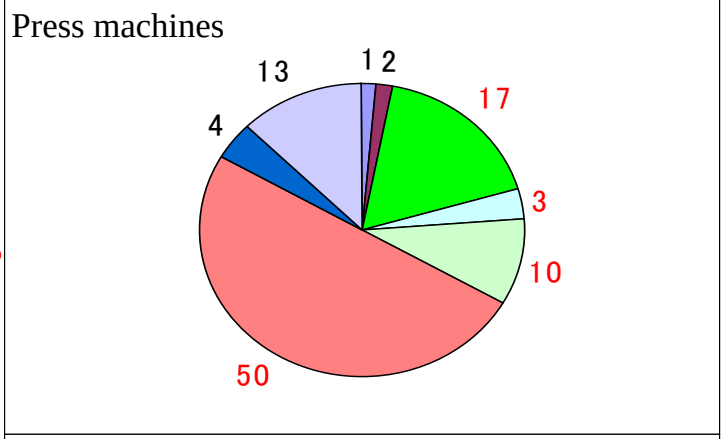
1. China, North America, Thailand, and India account for 77% of exports.
2. China accounts for 40% of press machinery, followed by North America and Thailand. Europe's share is small.
3. North America accounts for 30% of sheet metal machinery and Europe 20%, which comes to 50% of the total.

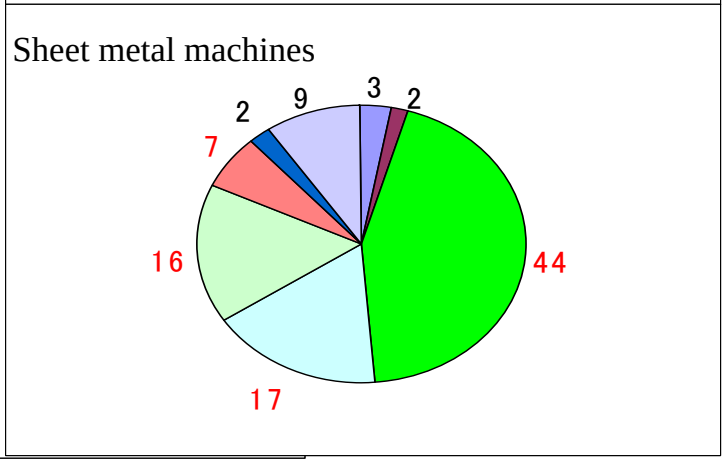
P·9 NEXT: Order analysis by demand source

Forming machine order source analysis: press machine/sheet metal machine comparison

From domestic industry 2005







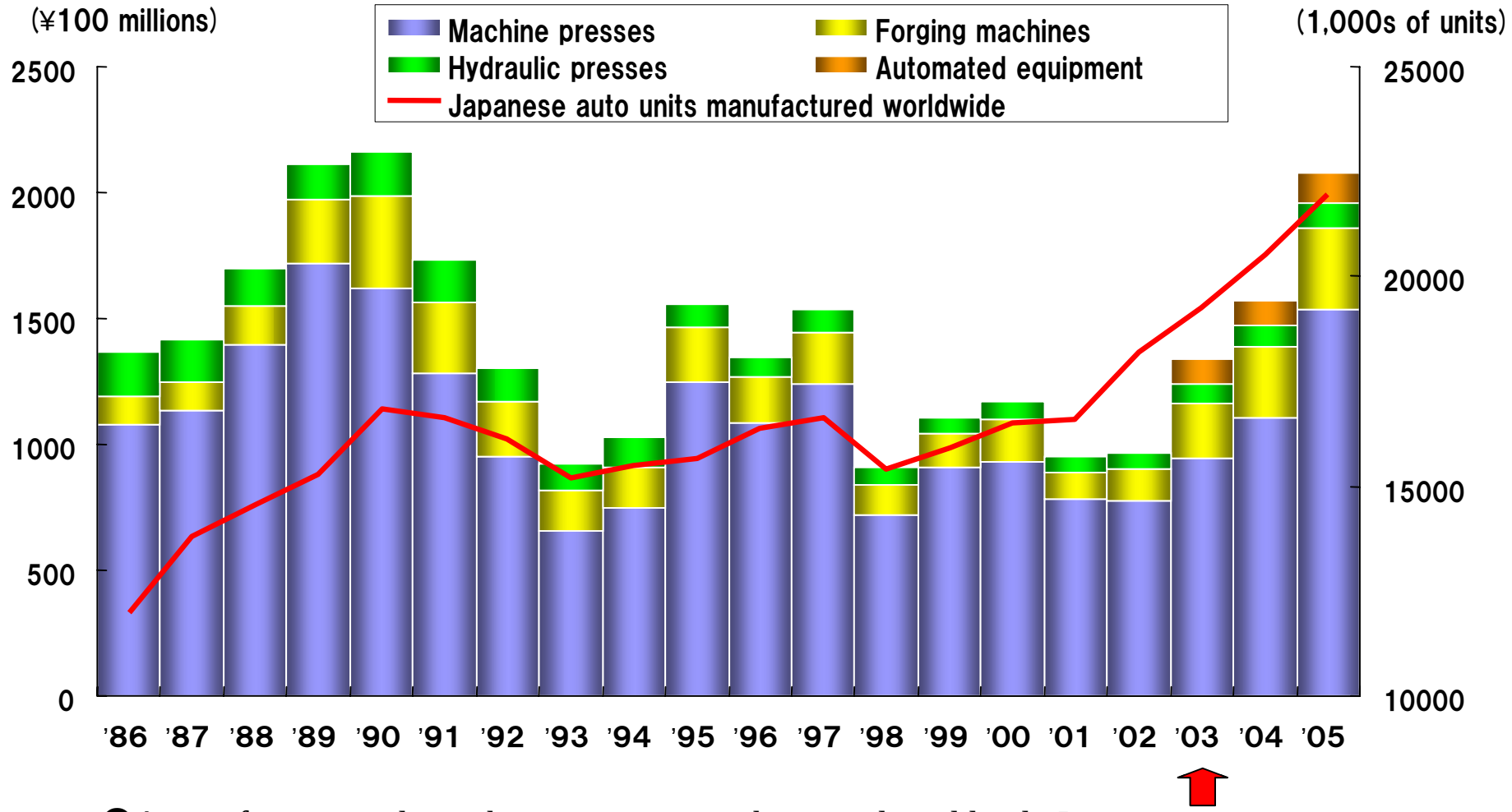
1. **Press machinery is heavily weighted to the transportation category. This category, together with metal components and automobile-related manufacturing, comprises more than 70% which can be attributed to automobile manufacturing. The growth in investment in overseas automobile manufacturing has contributed greatly to the growth of press machine manufacturing.**

2. **User distribution by industry has been largely unchanged over the last 15 years. One issue for growth of our industry is the cultivation of new users (industries) to follow the healthy share taken by the automobile industry.**

P·10 NEXT: Analysis of correlation between Japanese automobile trends and industry

Correlation between yen totals of press-type forming machine orders and volumes of Japanese automobiles manufactured worldwide

Forming machines: machine presses, forging machines, hydraulic presses, automated equipment

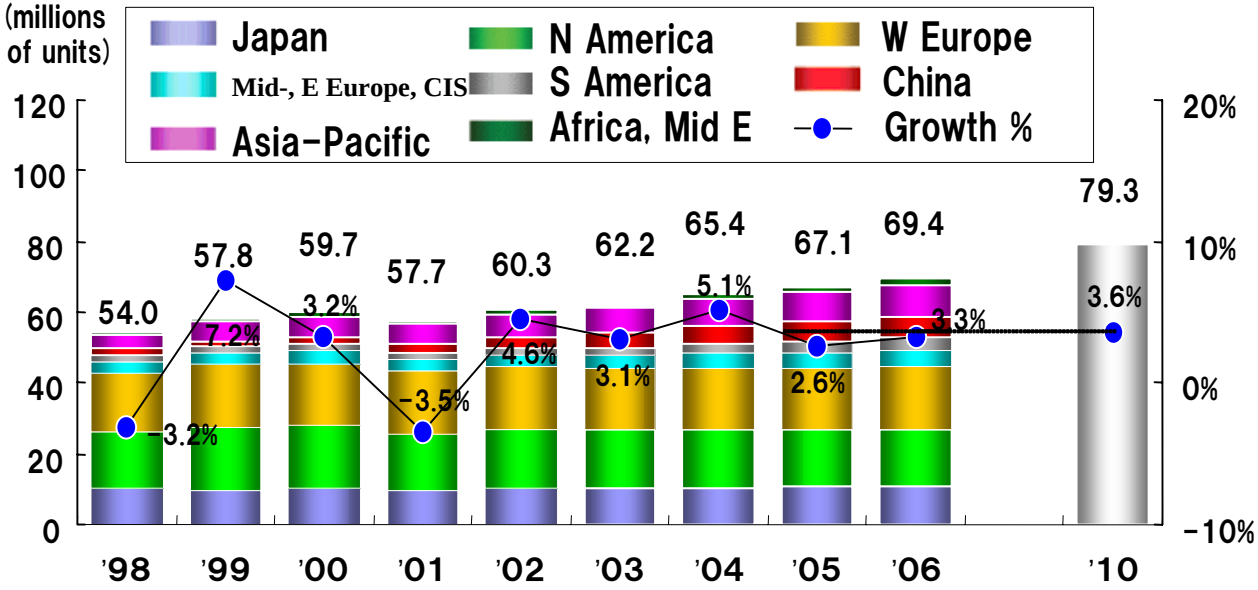


- A significant correlation between press machines and worldwide Japanese auto output
- This correlation is especially pronounced from 2003

P·11 NEXT: Movement of Japanese auto output by region

Shift in auto output by global region

Source
Through 2006: FOURIN Inc. automobile statistics
Year 10 : US JD Power And Associates

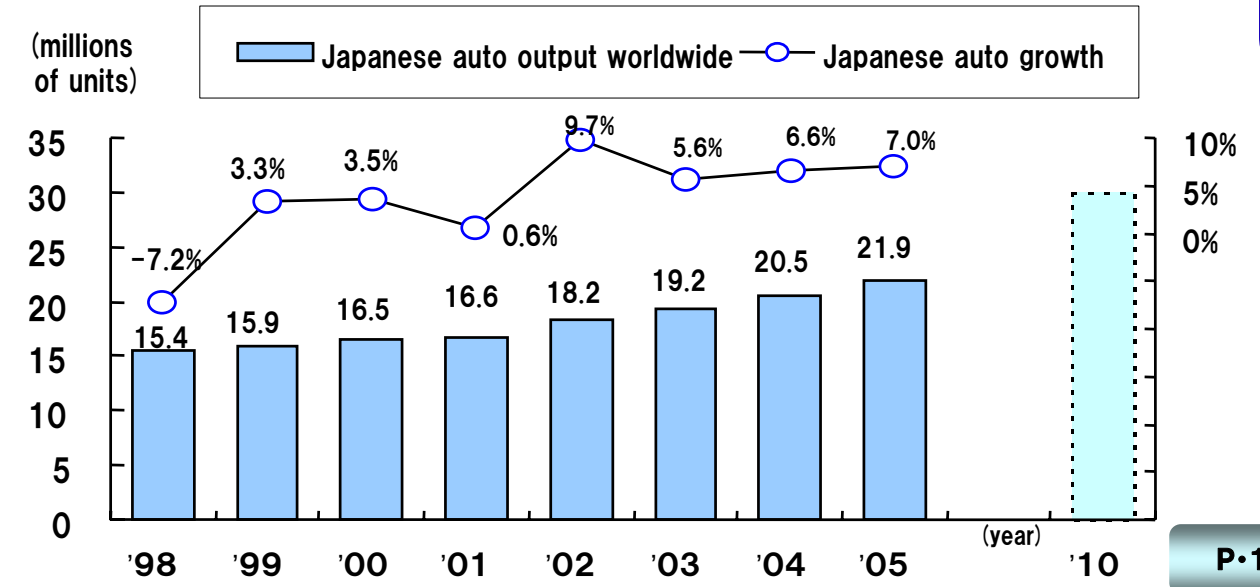


- 3 to 5% annual growth
- Growth mostly in China, Asia
- 3% annual growth going forward

While no growth is anticipated for domestic output, increasing output of overseas Japanese auto manufacturers and suppliers, and the establishment of new overseas manufacturing centers are expected to increase press machine demand!!

Shifts in worldwide Japanese auto output

Statistics through 2005 from Japanese Automobile Manufacturers Association, year 10 is an estimate



Japanese auto worldwide manufacturing trends

- **5 to 7% annual growth**
- **Around 6% annual growth going forward**

P·12 NEXT: Chap. 2: Industry strengths, weaknesses

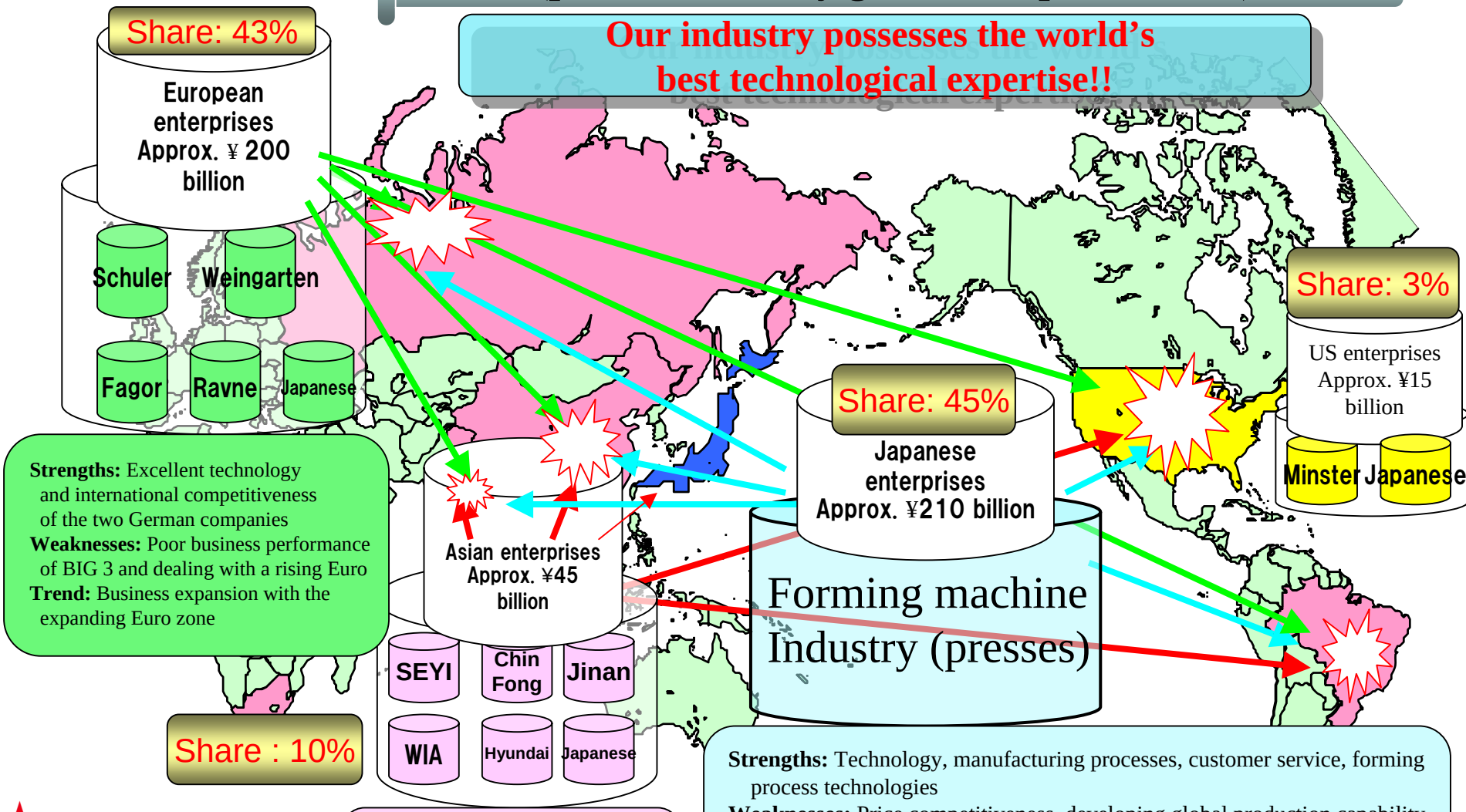
Chapter 2: The forming machine industry: strengths and weaknesses

P·13 NEXT: Industry strengths and weaknesses (global analysis)

Analysis of current global conditions

Industry strengths and weaknesses (press machinery global competitiveness)

Our industry possesses the world's best technological expertise!!



Strengths: Excellent technology and international competitiveness of the two German companies
Weaknesses: Poor business performance of BIG 3 and dealing with a rising Euro
Trend: Business expansion with the expanding Euro zone

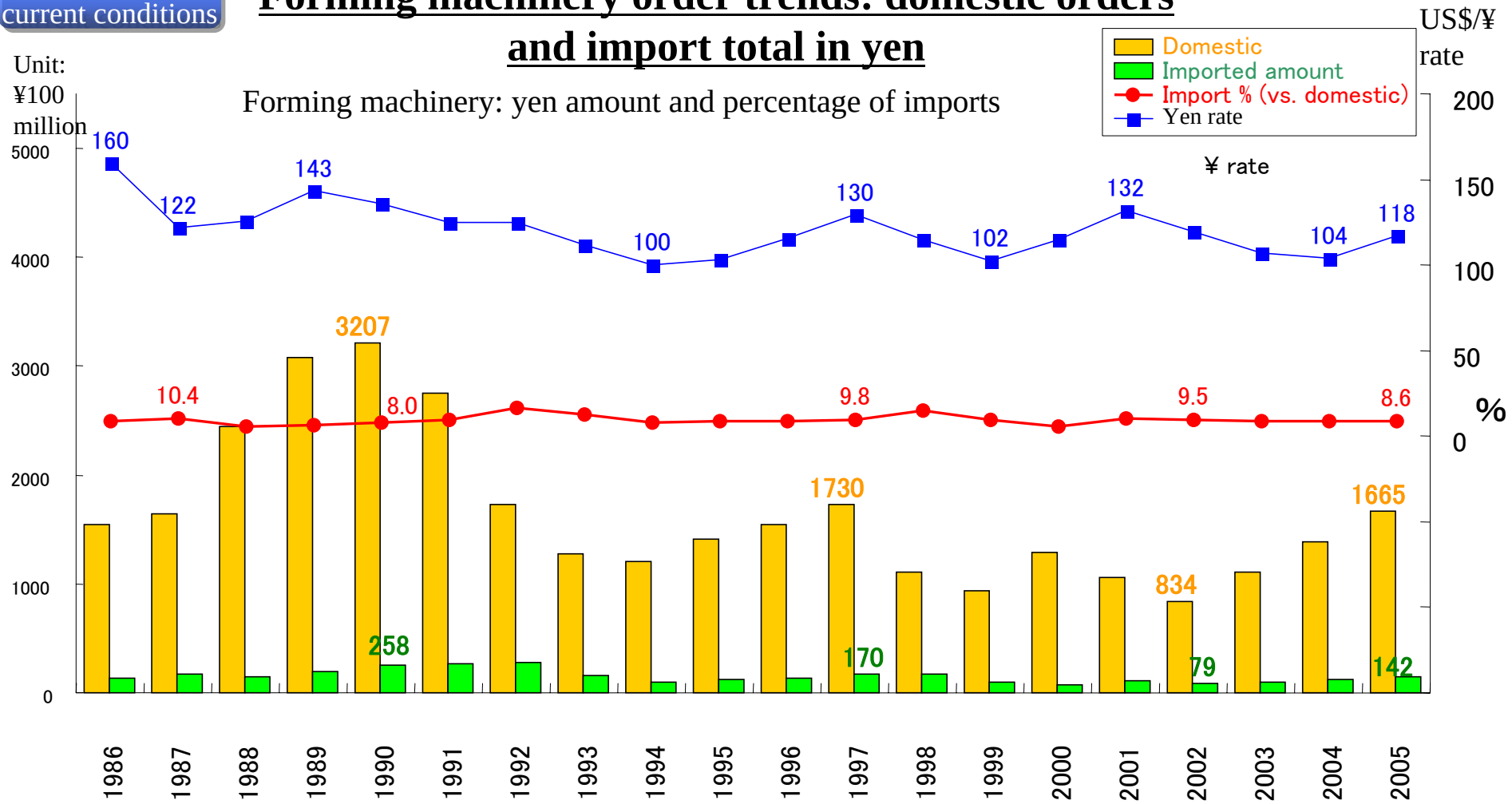
Strength: Price competitiveness
Weaknesses: Technology and quality
Trends: Improve technology and quality; enter Japanese market

Strengths: Technology, manufacturing processes, customer service, forming process technologies
Weaknesses: Price competitiveness, developing global production capability (with some exceptions), competitiveness in EU market
Trend: Market growth accompanying entry of Japanese automobile manufacturers into overseas markets (growth of BRIC markets)

★ **Overseas results of Japanese overseas manufacturers are included in Japan results**

P·14 NEXT: Analysis of current machinery imports

Forming machinery order trends: domestic orders and import total in yen



1. In response to domestic demand, imported machinery moves in the 8% range. This will not significantly change since yen-dollar fluctuations and the growth of the machine industry in neighboring countries will not impact the industry's novel technology, price competitiveness, and established customer base.

P·15 NEXT: Chap. 3: Biggest priorities for industry members

Chapter 3: The most important priorities for association members

Priorities of members of the Japan Forming Machinery Association

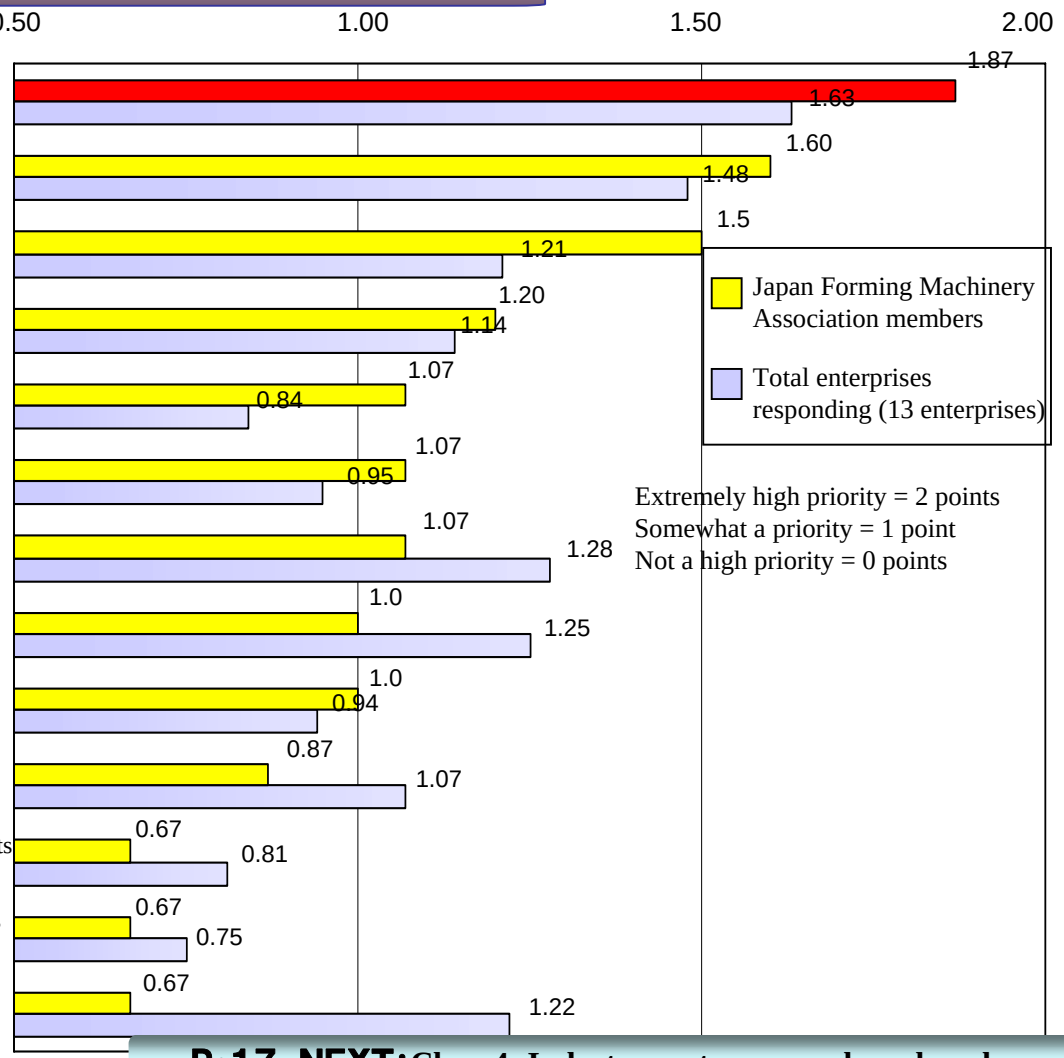
(According to a METI survey)

Members are most focused on: developing novel technology and expertise

Priority score by industry group

Enhancing originality

【Enterprise priorities】



① **Novel technology and expertise, organizational capability, customer network, etc. awareness and utilization**

② **Articulating the company's core management principles and strategy**

③ **Cultivate new users and industries**

④ **Enhance ability to flexibly adjust to what customer's require**

⑤ **Develop overseas business by gathering overseas data, entering overseas markets, and forming partnerships with local business entities.**

⑥ **Ensure human resources by strengthening connections with universities and technical and vocational schools**

⑦ Create an employee friendly working environment

⑧ Correct inadequate business practices

⑨ **Develop technology through partnerships with upstream/down stream businesses**

⑩ Correctly evaluate and assess company technology

⑪ Stimulate constructive communication between closely connected departments

⑫ Constructive partnerships with businesses in the same and different industries

⑬ Training the next generation of managers

P・17 NEXT: Chap 4: Industry customer needs and seeds

Chapter 4: Industry customer needs and seeds

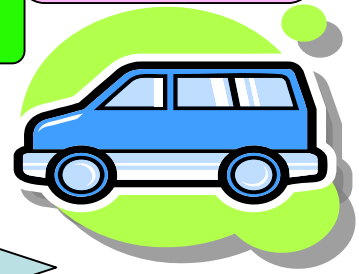
Customer needs and seeds*
(*new materials and technology supplied by the industry)

Customer industries

Forming machinery industry positioning and fabrication processing

Core industry
Formed and fabricated materials

Key industries
Automobiles
electrical machinery,
electronics industry, other industries



Needs & Seeds

Transport equipment

Forming machinery

Safety equipment

Fabrication

Materials

Molding

Lubrication

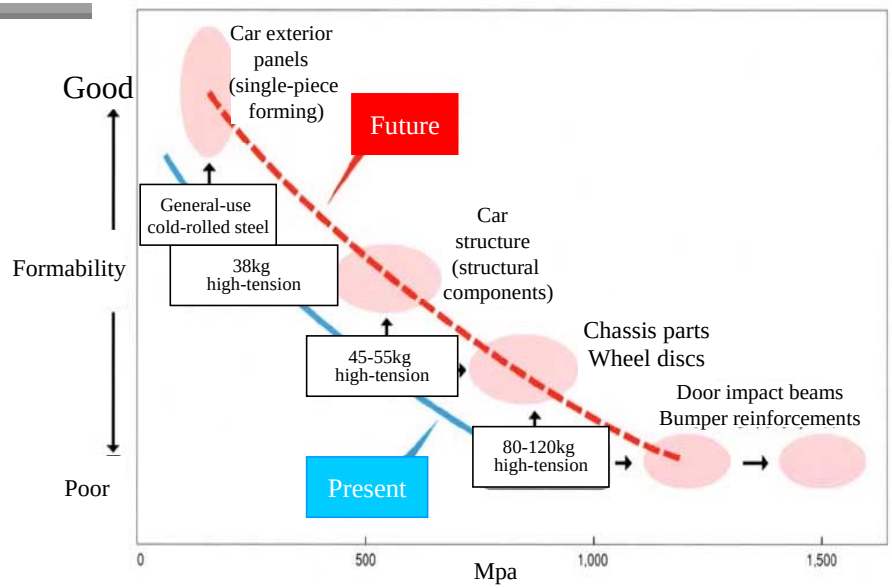
High Value-added components

P·19 NEXT: Automobile part needs

1) Automobile parts manufacturing needs

Relations between metal press technology and automobiles

Engine parts	Cylinder head cover, manifold, oil pan, fuel tank, gaskets, injector nozzle	Lightness, complex shape, high strength, excellent durability	Aluminum alloy, etc. processing technology; molding simulation technology; high-tension materials processing technology
Body parts	Body, chassis, frame, radiator, grill, muffler, hinges, pedals, parking brake lever, hanger beam assembly	Lightness, complex shape, high strength, excellent durability	High-tension materials processing technology; aluminum alloy, etc. processing technology; hydro-forming; hydraulic counter-pressure forming; molding simulation technology; complex press processing technology; springback technology; etc.
Suspension and brake parts	Suspension	Lightness, complex shape, high strength, excellent durability	Tailored blanks; molding simulation technology; aluminum alloy, etc. processing technology; etc.
Driving parts	Differential, sprockets, clutch hub, AT gear, etc.	Lightness, complex shape, high strength, excellent durability	High-performance materials processing technology; molding simulation technology; etc.
Other	Press processing components used in all types of parts	Lightness, complex shape, high strength, excellent durability	In addition to the above, technologies enhancing machine tool durability, material position locating technologies, etc.



Data on high-tension material trends: JFE Steel

Plate formed components

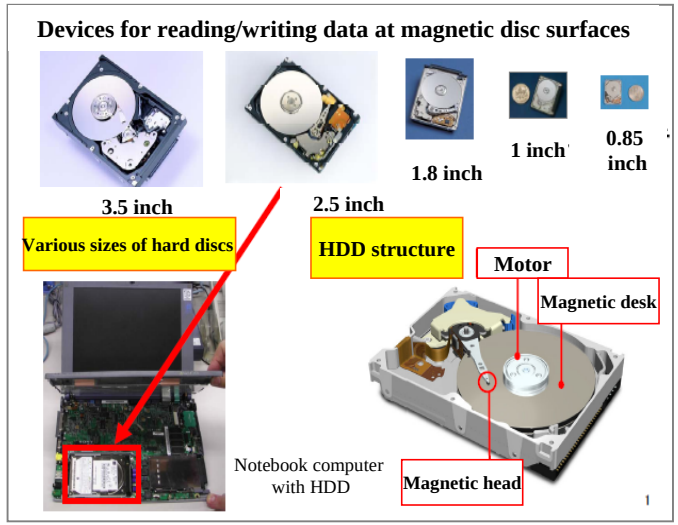
Source: Mitsubishi Research Institute basic research on strengthening competitiveness of key national industries by improving metal press technology

P·20 NEXT: Home information appliance part needs

2) Home information appliance parts needs

Relations between metal press technology and home information appliances

Parts		Required features	Relevant press technologies
Semiconductors, electronic components	Lead frame, Floppy disk center hub, shutter	Miniaturization, structural refinement, high precision	Precision & micro-fabrication technology; burr-free shearing; de-burring technology; scrap prevention technology; etc.
Internal parts	Fittings, housing, switches, relays, terminals, connectors, driving gears, button battery casing, electrodes	Miniaturization, structural refinement, high precision, complex shapes	Precision & micro-fabrication technology; driveless technology; scrap-free fabrication technology; etc.
Hard discs, CDs, MDs, DVDs	HDD suspension gimbal, mount plate, lens pickup suspension, case, bearings, needle	Miniaturization, structural refinement, high precision	Precision & micro-fabrication technology; burr-free shearing; de-burring technology; complex press processing technology; etc.
Motors	Core plate, case	Miniaturization, high precision, automatic laminating	Precision & micro-fabrication technology; interior lamination technology



HDD development trajectory (NEDO technical materials)

Source: Mitsubishi Research Institute basic research on strengthening competitiveness of key national industries by improving metal press technology

Micro-fabricated component parts required by mobile phones (NEDO technical materials)

⇒ RF antenna (high-frequency antenna)

⇒ RF switch
(micro high-speed frequency-conversion switch)

⇒ RF resonator, RF condenser
(variable condenser and resonator)

⇒ Tuner, filter

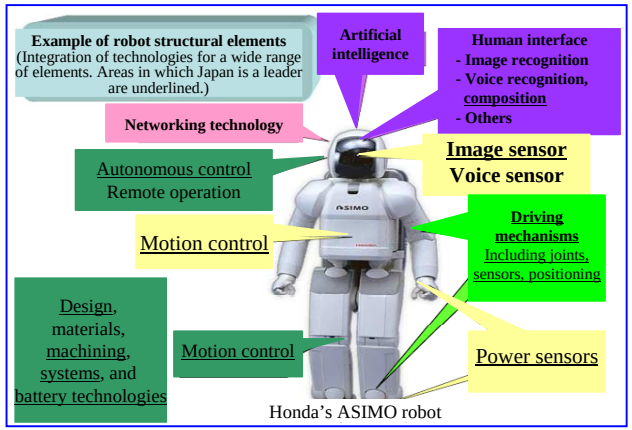
⇒ Directional microphone

P·21 NEXT: Needs of the robotics field

3) Needs of the robotics field

Relations between metal press technology and robotics

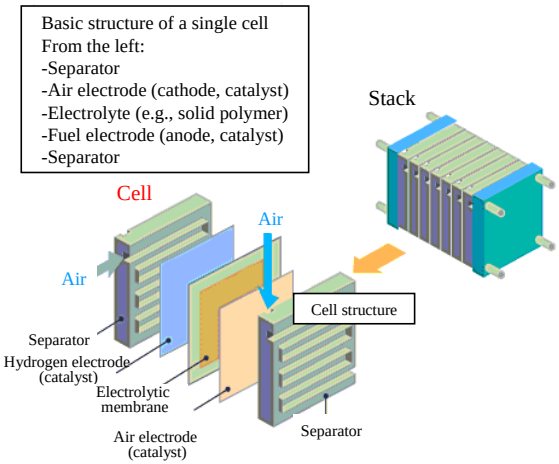
Parts		Required features	Relevant press technologies
Surface components, body structure components		Miniaturization, structural refinement, high precision	Incremental forming; complex press processing technology; etc.
Driving components, driving structural components, manipulators	Actuator, sensor, motive mechanism	Miniaturization, structural refinement, high precision	Micro-forming; complex press processing technology; etc.
Semiconductors, electronic components	Sensor-related small components	Miniaturization, structural refinement, high precision	Precision & micro-processing technology; scrap prevention technology; etc.
Fuel cell	Separator	Miniaturization, structural refinement, high precision, excellent durability	Special materials processing technology; precision & micro-processing technology; etc.



Robot structural elements (NEDO technical materials)

Relations between metal press technology and fuel cells

Parts	Required features	Relevant press technologies
Separator	Miniaturization, structural refinement, high precision, excellent durability	processing technology; imprinting technology; precision & micro-processing technology; etc.



Fuel cell structure (NEDO technical materials)

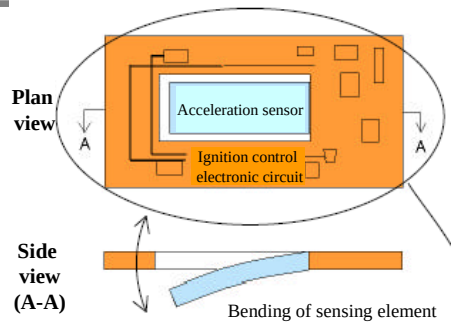
Source: Mitsubishi Research Institute basic research on strengthening competitiveness of key national industries by improving metal press technology

P·22 NEXT: Needs of advanced technology products

4) Needs of advanced technology products

Micro Machines
MEMS: Micro Electro Machine System

Airbag high-speed sensor



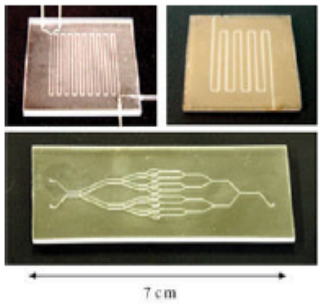
Airbag acceleration sensor chip

Micro-chemical chip (DNA analysis)

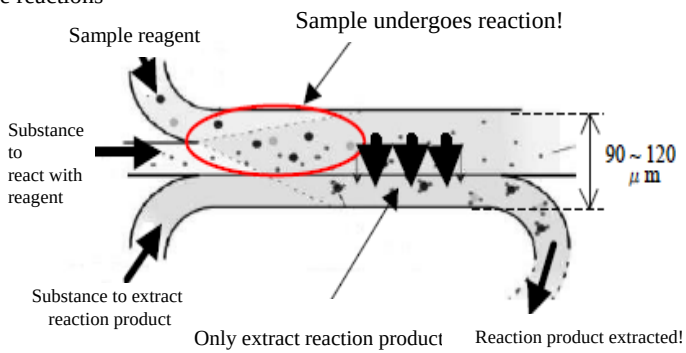
-MEMS etching technology is used to etch microscopic reaction channels on materials such as glass substrates. Chemical substances react in these channels.

-Design is crucial for optimizing the efficiency of test reagents and extracting reaction products. (Calculating optimal chip layout, calculating flows for optimal chemical reactions, and so on.)

The benefits of reduced size
- Reaction completes in a short period of time
- Possible to use micro-substance reactions

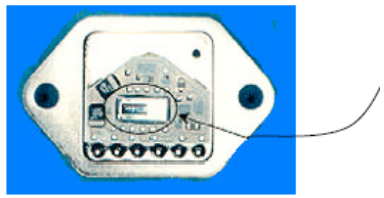


Micro-chemical chip

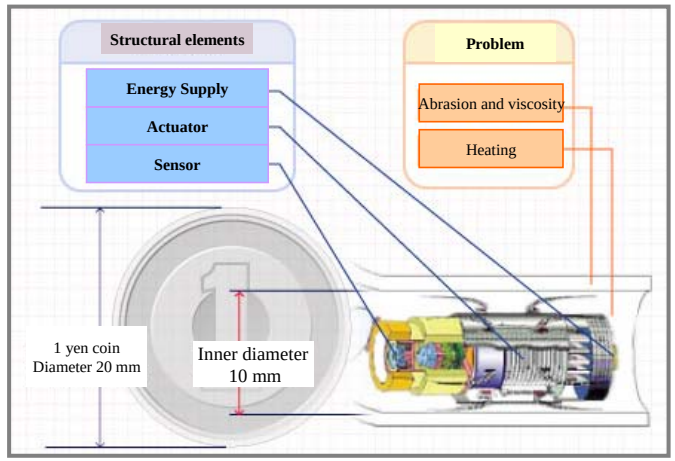


Principle mechanism of a micro-chemical chip

Chip size: 2 cubic mm
Device size: 15 cubic mm



Airbag control unit with acceleration sensor chip



Source: NEDO technical description

P·23 NEXT: Forming process seeds

Forming process seeds



The five categories

1. Composite forming
2. Double-action forming
3. Sequential forming
4. Hydraulic forming
5. Micro-precision forming

Forming materials

Difficult to work materials

High-performance materials

Light-weight materials

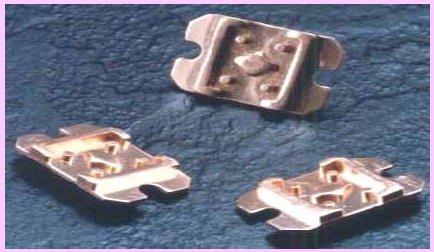
Unusual materials

Tailored blank

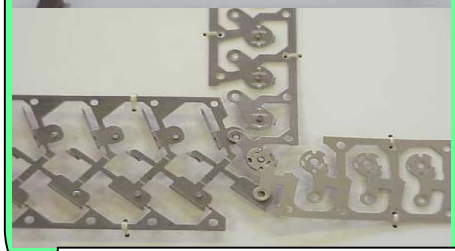
P·24 NEXT: Composite forming seeds

1) Composite forming (combining several techniques)

Deformation processing and cutting

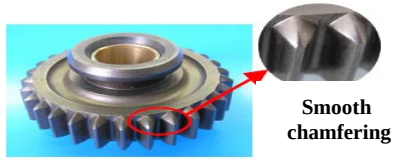


Deformation processing and bonding



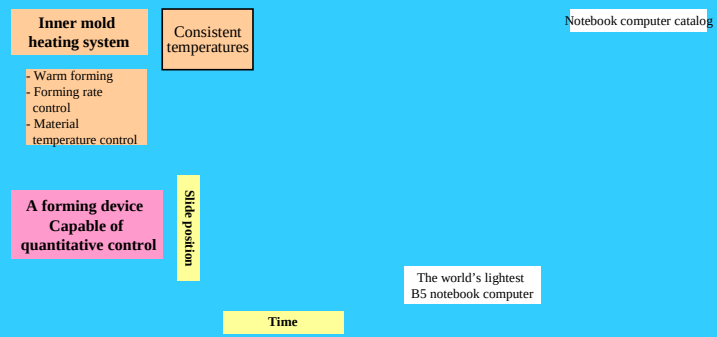
Courtesy Seki Corporation

Hot forging and cold forging



Courtesy O-Oka Corporation

Sheet metal forming-cold forging composite forming



Courtesy Sanki Corporation

P·25 NEXT: Double-action forming seeds

2) Double-action forming

Vibration forming

Characteristics

- Forms high-precision, high-value added shapes
- Reduces processing steps and therefore mold and equipment costs

Sheet metal forming

Precision blanking

Drawing ⇒ **FCF method** Compression drawing

Courtesy Hadano Seimitsu

Courtesy Toyota Motor Corporation

Forging

Enclosed forging

Back pressure forming

Courtesy Alpha

Hydraulic forming

Hydro-forming
Hydraulic counter pressure forming

Courtesy JFE Steel

P·26 NEXT: Sequential forming seeds

3) Sequential forming

1.Characteristics

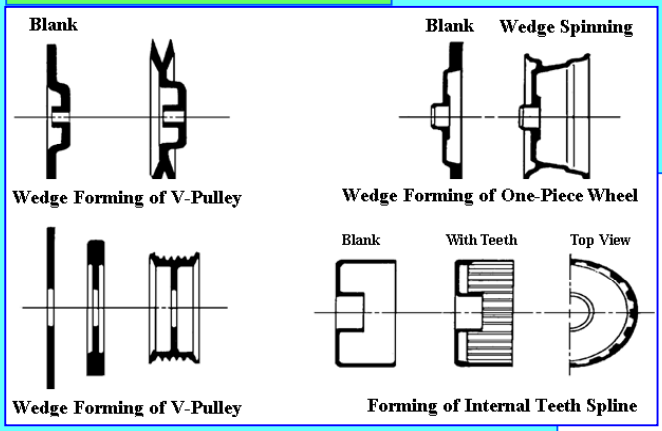
◆Resource, energy efficient

Sequential forming can be performed with small capacity, compact equipment

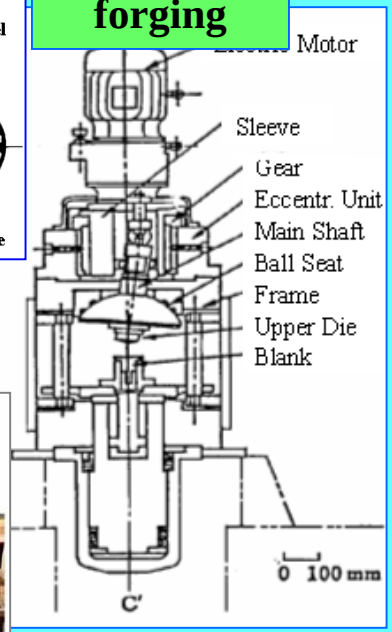
◆Suitable for producing a large number of parts in moderate amounts

Reduces die number and cost, post processing in-line forming

Flow forming



Vibration forging



2. Methods

Sheet metal forming	Cold forging
Spinning, Rolling	Vibration forging
Flow forming	
Incremental forming	

Incremental forming

P·27 NEXT: Hydraulic forming seeds

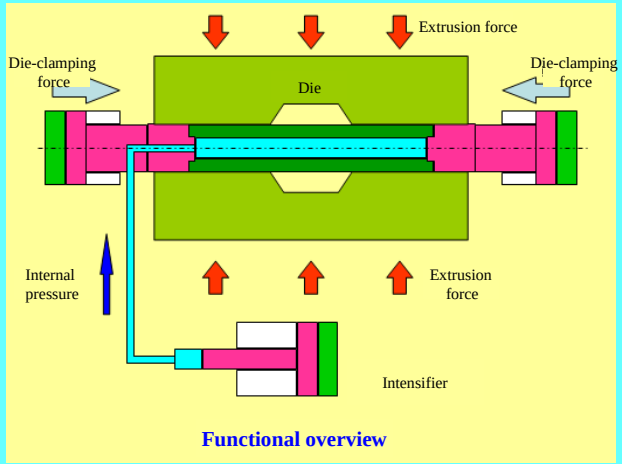
4) Hydraulic forming

1. Characteristics

1) Hydraulics do the molding
- **3D stress (hydrostatic pressure) enhances formability**
- **Reduces number of die parts**

2) Environmentally friendly, emission free process

3) Small, medium volume production of multiple parts

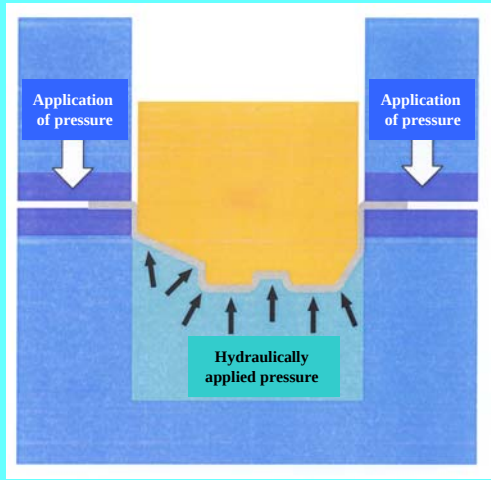


Hydro-forming

2. Methods

1) Hydro-forming

2) Counter-pressure hydraulic forming



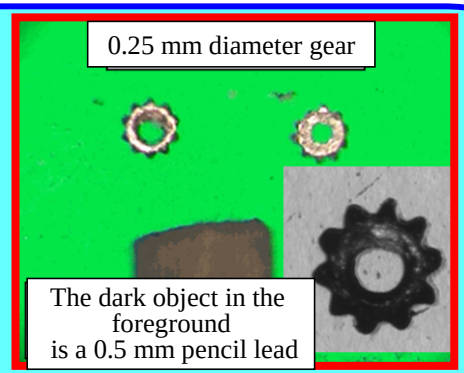
Counter-pressure hydraulic forming

P·28 NEXT: Micro/precision forming seeds

5) Micro/precision forming

1. Characteristics

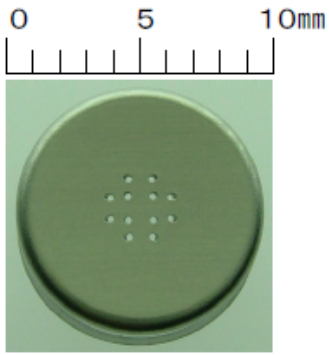
★ Growing production of environmentally friendly, compact, and light products
★ Growing demand for micro-precision parts
★ Shift from etching and micro-machining techniques



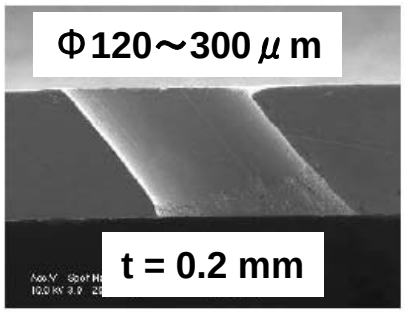
2. Object components

Organization for Small & Medium Enterprises and Regional Innovation: Project to Strengthen Strategic Core Technologies

★ Automobile fuel injector nozzle



【12-nozzle component】

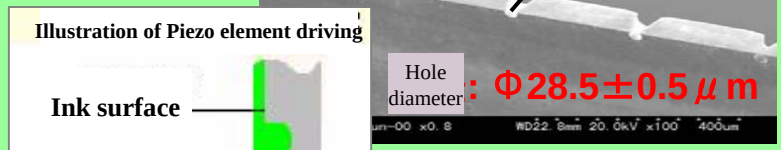


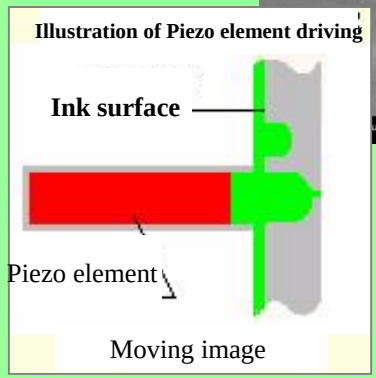
【Electron microscope photograph of a slanted hole made by press punching】

Komatsuseiki Kosakusho co.ltd.

★ Micro-level forming: Multi chip module grooves

★ Inkjet printer nozzle





1 line, 48 hole
6 line forming

P·29 NEXT: Chap 5: The direction of forming machine technology

Chap. 5: The direction of forming machine technology

P·30 NEXT: The direction of technology development (1)

The direction of technology development (1)

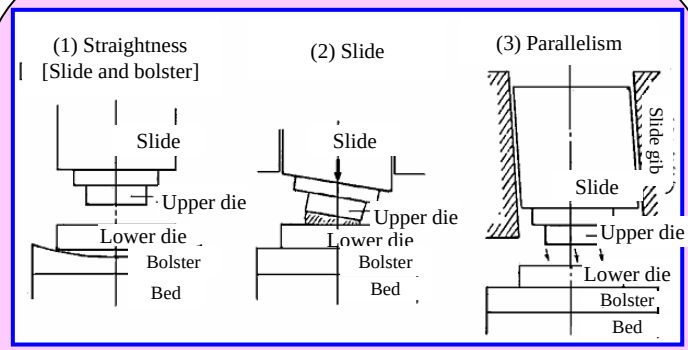
3-1 Forming machine technology that contributes to net-shape forming

1) Ultra-precision, high rigidity

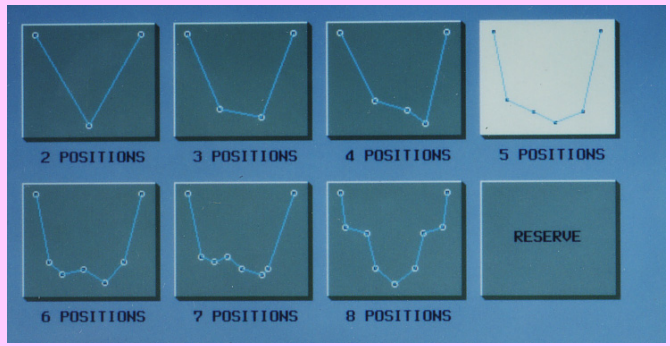
Improves mother machine dynamic geometrical precision (slide and bolster straightness, parallel positioning, angles, bottom dead center, eccentric load, etc.)

2) High-performance with digital control

- **Optimal slide motion control**
- **Optimal press moving part pressure force, speed, and position**
- **Dynamic geometrical accuracy control**
- **Elastic deformation, bottom dead center position control**



Slide geometric precision



Optimal slide motion settings

P·31 NEXT: The direction of technology development (2)

The direction of technology development (2)

3-2 Forming machine technology that contributes to energy and resource conservation

Press machines

1) Energy efficient running systems and operating mechanisms

- **Servo technology for optimal motor drove control**
- **Reduced friction drag, lubrication free sliding parts**

2) Compact structure (resource, energy efficient)

- **Net shape forming with high-precision, highly rigid press**
- **Has benefits of reducing workplace size (installation area, height), reducing material and energy costs, and enhancing LCA (life cycle assessment) performance**
- **In-line forming**

3) Universal applicability

- **1 unit performs the functions of a wide variety of press machines**

P･32 NEXT: The direction of technology development (3)

The direction of technology development (3)

3-2 Forming machine technology that contributes to energy and resource conservation

Press machines

4) Composite forming

- **Multi-process forming**
- **Module press**

→ **Composite forming with techniques from other fields**
Composite forming using multiple techniques

5) Multi-operation

Up-down, left-right, forward-reverse operation

→ **Net-shape forming with reduced process steps, complex shapes**

6) Forming of hard to work materials

- **Slide motion, speed setting discretion**
- **Localized heating, temperature control**

→ **Light materials (high-tensile, aluminum alloys, magnesium, titanium, etc.)**

P·33 NEXT: The direction of technology development (4)

The direction of technology development (4)

3-2 Forming machine technology that contributes to energy and resource conservation

Press machine forming system

1) Intelligent forming system

- **Optimal control system for high output and high energy efficiency**
- **Full turn key forming system including die**
- **24 hour unmanned running system**

Inline output inspection and correction system (robust sensor)

Die, material replacement system

2) Small-medium output of many different parts

→ **Sequential forming compatible**

- **Reduced die, material replacement time**
- **Equipment with flexible material and handling**

3) Highly energy efficient warm and low temperature forming

- **Material and die temperature control system including localized heating of hard to work materials**

P·34 NEXT: The direction of technology development (5)

The direction of technology development (5)

3-3 Operator friendly press machines

Focus on smart operation in a comfortable working environment

1) Safety

- Combines safety and productivity

2) Environment

Low vibration and noise	▪ Silent forming	⇨ Motion, speed control
Emission free	▪ Dry press forming	⇨ No lubricant
Maintenance free	▪ Production management, preventive maintenance, malfunction diagnosis	

3) Information Technology for enhanced running efficiency

Reduced set up time	▪ Automatically set forming criteria and conveying time
	▪ Automatically replace die and material
Reduced trial time	▪ Forming simulation and press docking

P·35 NEXT: The direction of technology development (6)

The direction of technology development (6)

3-4 Micro-precision press for advanced technology fields

Creating new demand

1) Micro-precision forming

・Robot, micro-machine

Micro-chemical chip ⇒ **Single micron, nano level press processing**

2) Vibration forming

・ Vibration forming promoting enhanced formability and dry processing

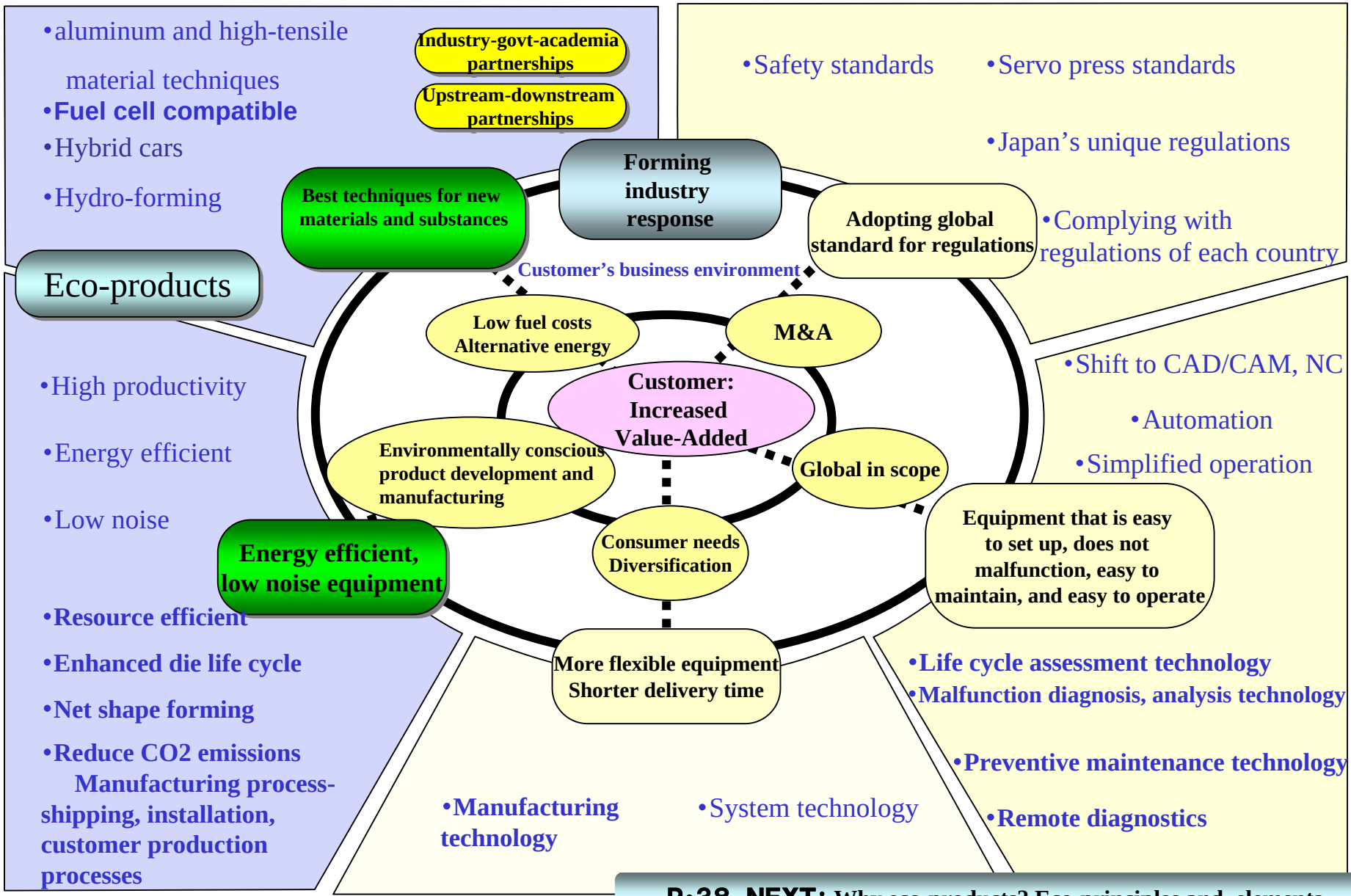
3) Forming hard to work materials ⇩

・High-performance materials: inconel, niobium, tantalum, molybdenum, plastics, plastic-metal composites, metal glass

Chapter 6: Why eco products?

The demand for eco-technology is a result of customer needs

The customer's environment and innovation in forming machine industry technology



P·38 NEXT: Why eco-products? Eco-principles and elements

Why eco-products? Eco-principles and elements

All user needs are tied to eco-products

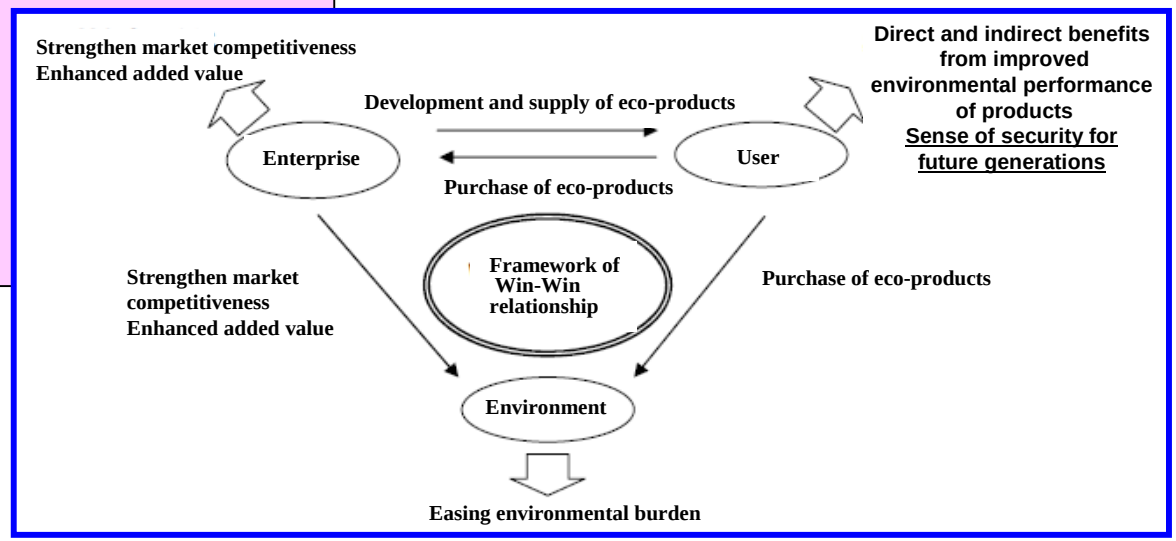
1. Eco-products are products and services differentiated by a focus on easing environmental burden.

2. Primary elements of eco-products

   1) Resource and energy efficient
   2) Reduced waste and toxicity
   3) Light, durable, enhanced recycling
   4）Enhanced die life cycle
   5）Net shape forming

Achieving value-added

Win－Win



Source: METI Eco Products and Management Strategy Study Group

P･39 NEXT: Forming industry eco-products

Forming industry eco-products

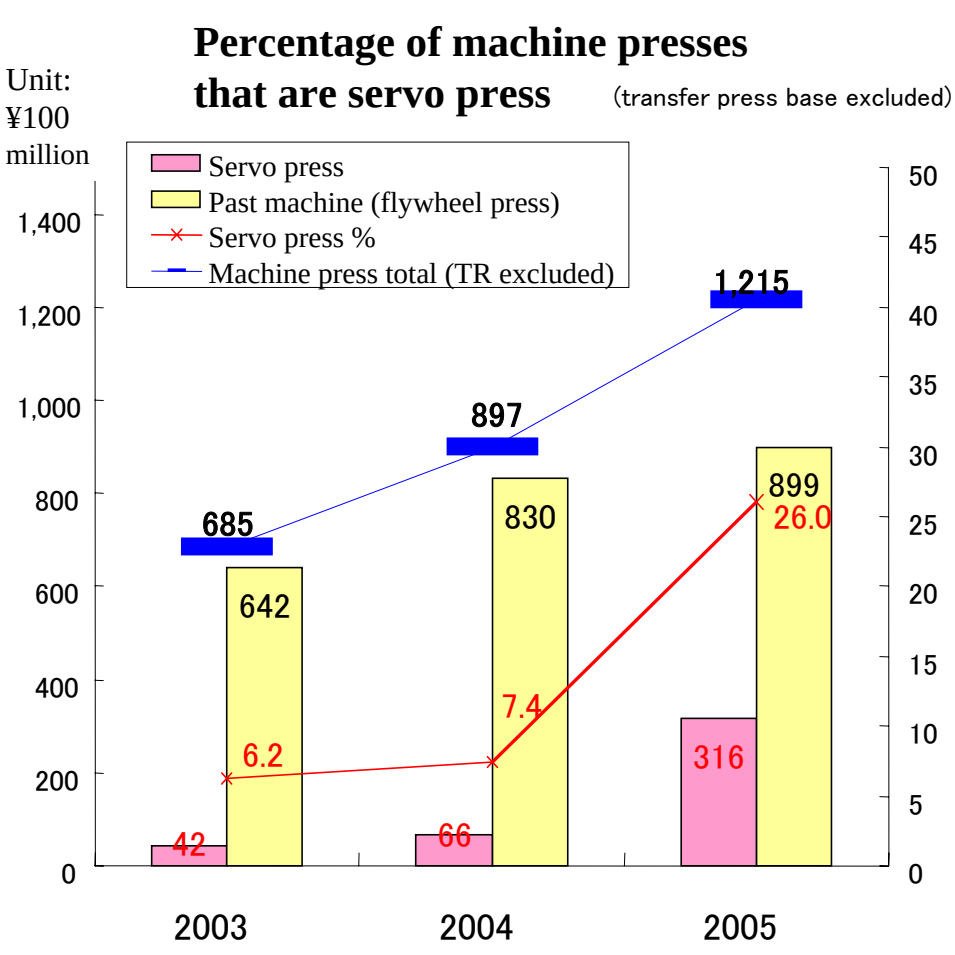
Current eco-products produced by the forming machine industry

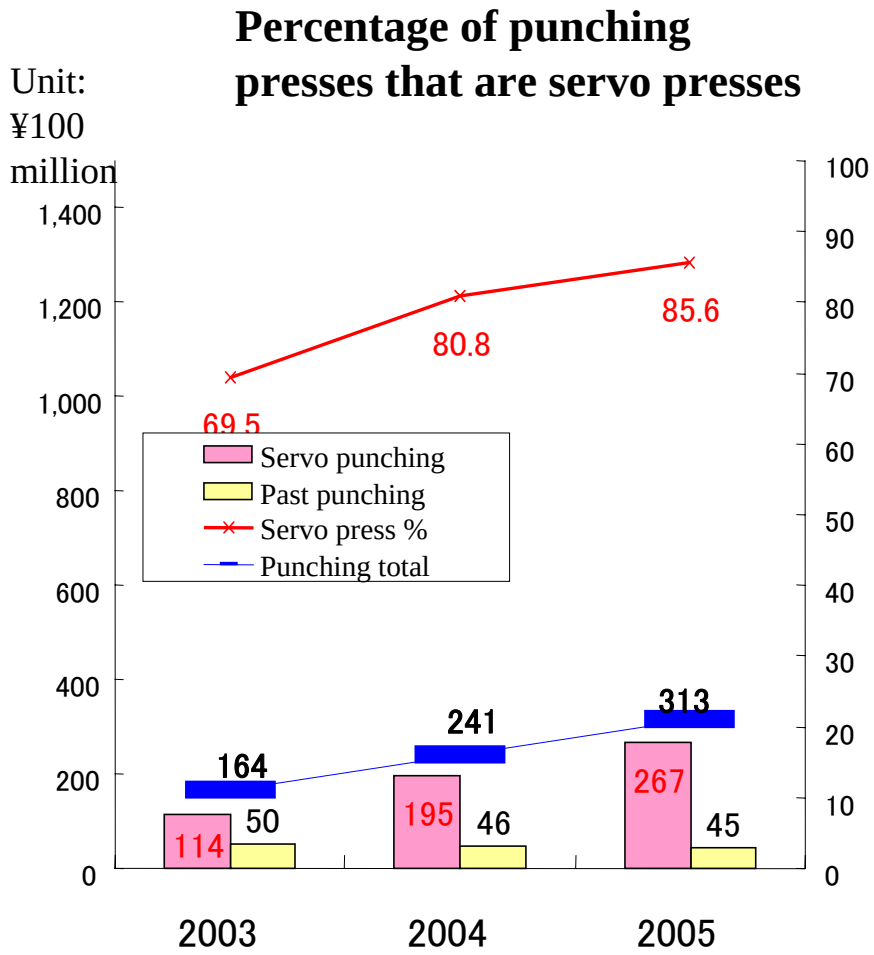
Machine name	Eco features	Function	Benefits	Target industry	Global value
C-press	○	Servo motor drive	Energy efficient, low noise, oil efficient	Automobile, metal products	World's only one of its type
Straight side press	○	Servo motor drive	Energy efficient, low noise, oil efficient	Automobile, metal products	World's only one of its type
High-speed press	○	Servo motor drive	Energy efficient, low noise, smaller size resource efficient	Electronic components	
Hydraulic press	○	Hydraulic pump drive servo motor	Energy efficient, low noise	Automobile, metal products	World's only one of its type
Hydro-forming machine	○	D.D.V type hydraulic servo pump	Energy efficient, low noise, oil efficient	Automobile, metal products	
Former	○	Incorporation of high-precision ball bearings, etc.	Energy efficient, low noise, low vibration	Automobile, nut and bolt manufacturers	
Pipe bender	○	D.D.V type hydraulic servo pump	Low noise, energy efficient, oil efficient	Automobile, metal products	
Thread rolling machine	○	Servo motor drive	Low noise, low vibration, oil efficient	Nut and bolt manufacturers	
Punching press	○	Servo motor drive. Regeneration mechanism	Energy efficient, low noise, low vibration	Metal products	
Press brake	○	Hydraulic pump drive servo motor	Energy efficient, oil efficient	Metal products	
Shearing					
Seam welding and forming equipment	○	Versatile form roller	Energy efficient, resource efficient	Automobile, metal products	
Feeder					
Safety equipment					

The use of servo motors in eco-products is spreading rapidly!!

P·40 NEXT: Servo press order trends for 03 to 05

Forming machines order trends: servo press





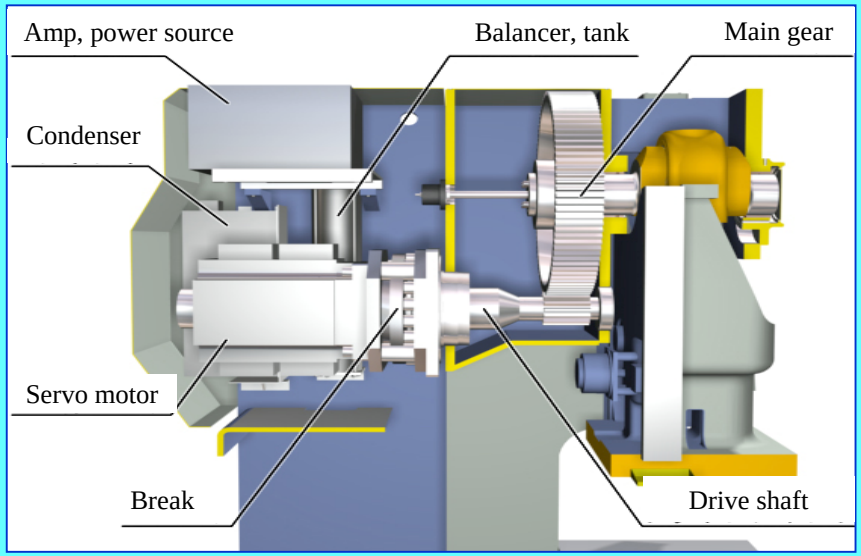
1. In 2005, growth for the old flywheel machine press was small while servo press machines increased almost five fold to 26% of the total.

2. The shift of sheet metal punching presses to servo machines continues and has exceeded the projection of 80%.

P·41 NEXT: Eco-products presentation (universal press)

Universal servo press

Only product of its kind



Market competitiveness

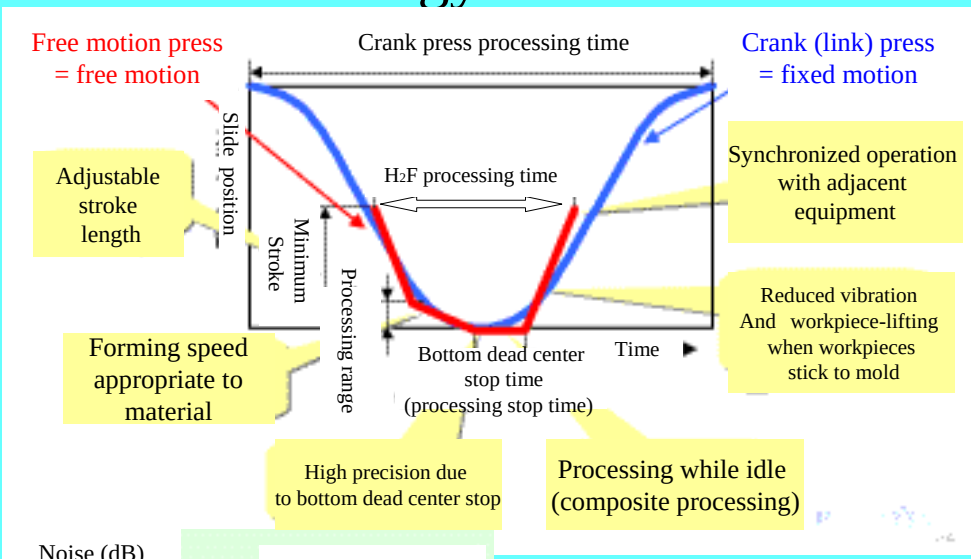
Technological strength

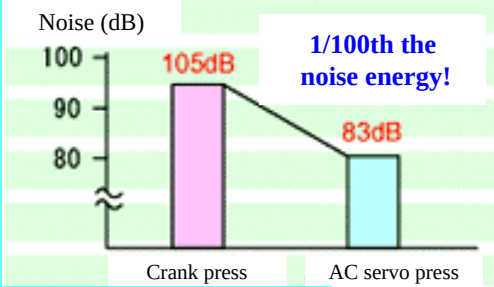
P·42 NEXT: Eco-product presentation (straight side)

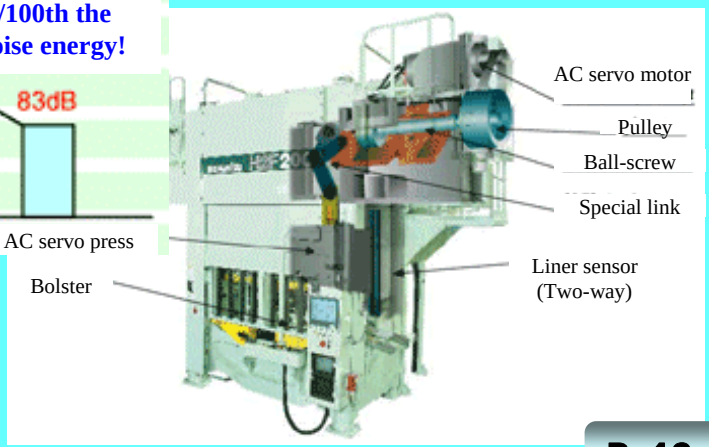
Link-type servo press
(tandem press line)

Only product of its kind

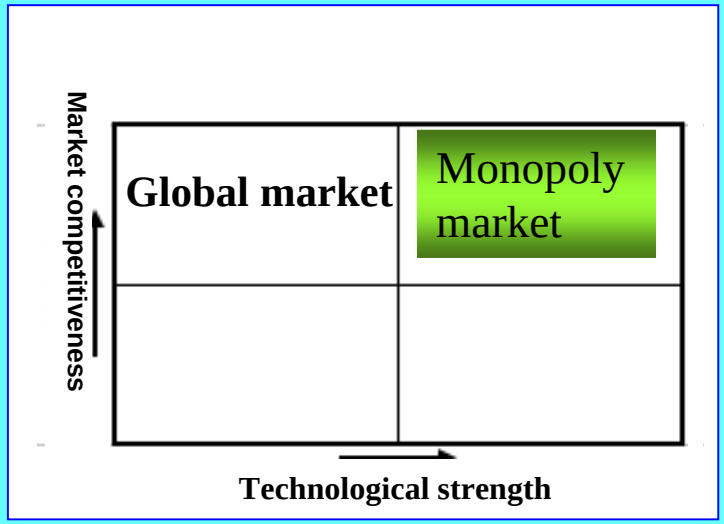
1. Technology features







2. Technological strength and competitiveness



P·43 NEXT: Eco-product presentation (high-rigidity press)

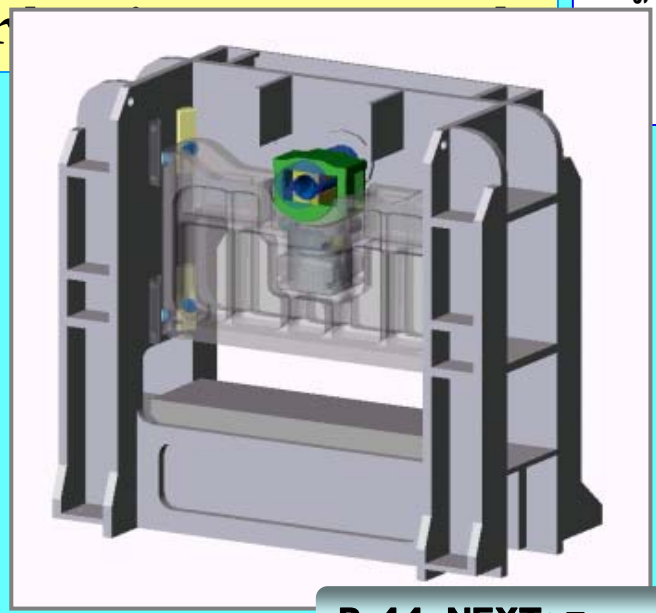
Ultra-high precision, high rigidity press

Only product of its kind

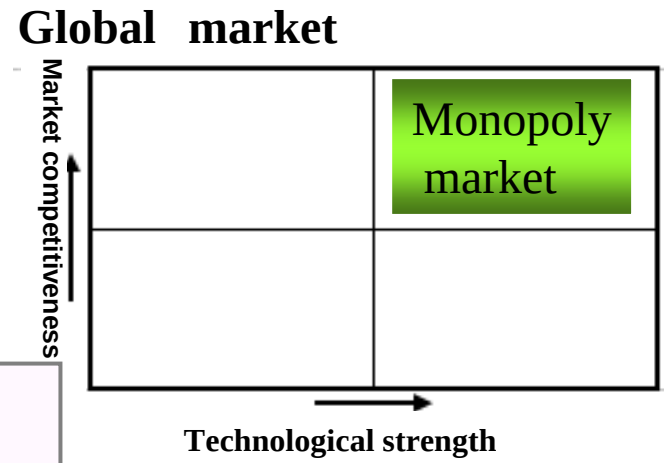
1. Technology features

Net shape, high-value added forming

- **"0" clearance slide gear face contact**
  ⇨**ensures high dynamic precision**
- **Excellent eccentric load performance**
- **Strong structure for**
  loads



2. Technological strength and competitiveness



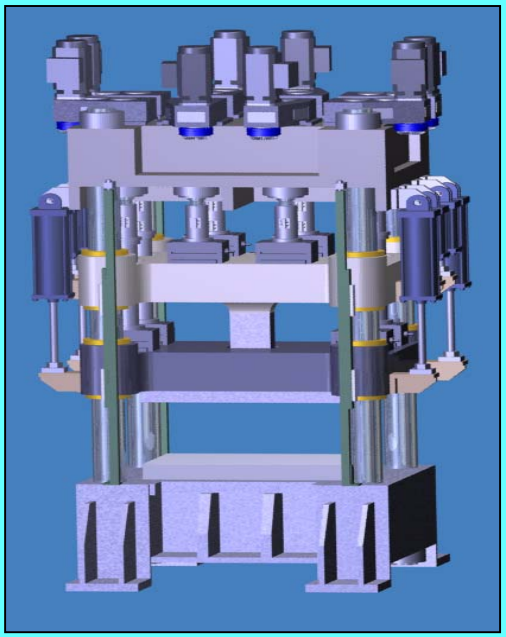
P·44 NEXT: Eco-product presentation (composite forming press)

Ultra-high precision composite forming press

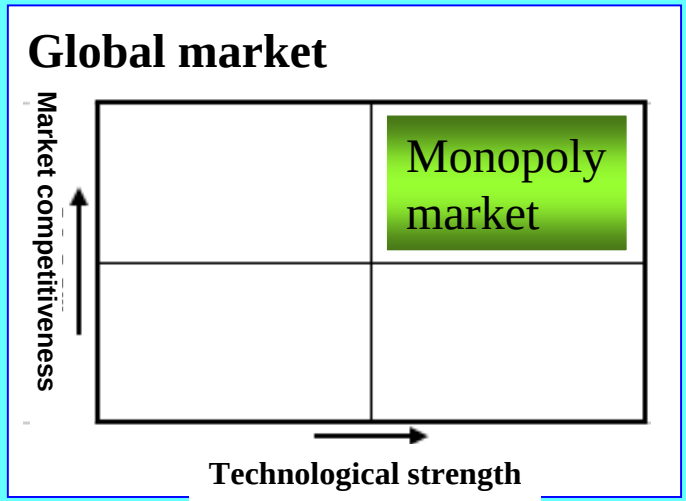
Only product of its kind

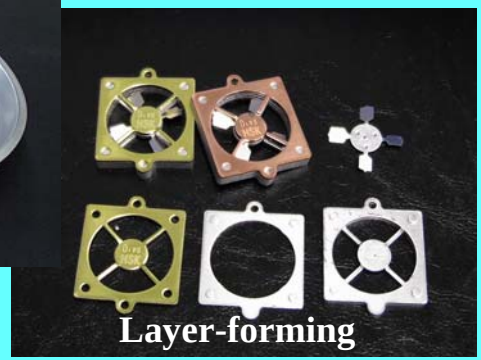
1. Technology features

- **Composite forming with all servo drive**
- **Multi-point for bearing eccentric loads**
- **Reduced processing steps and lower die costs**
- **Ultra-high precision press manufacturing**
- **Low volume output of multiple product types**



2. Technological strength and competitiveness





P·45 NEXT: Eco-product presentation (incremental forming)

Incremental forming machine

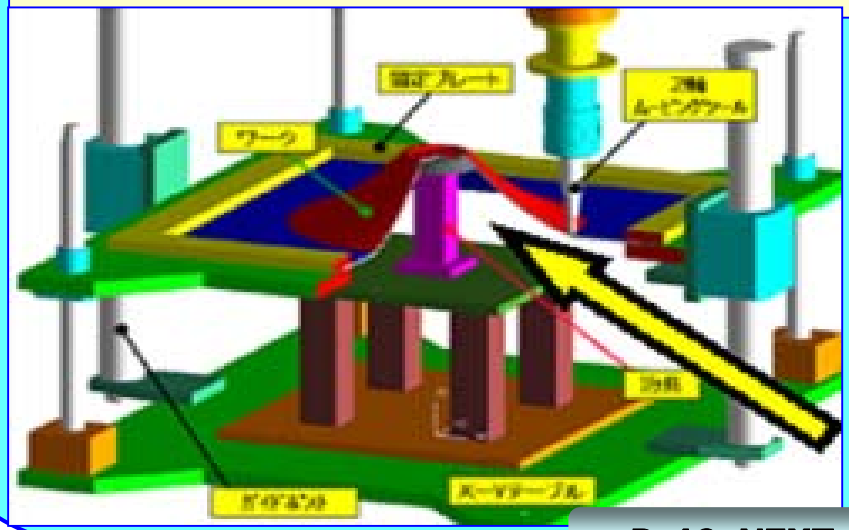
Only product of its kind

1. Technology features

From press machine to forming machine

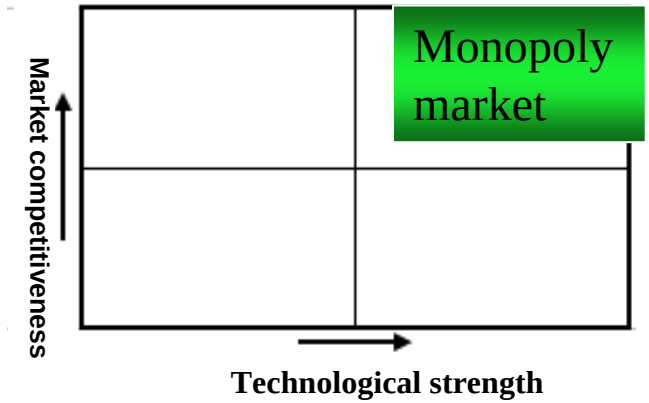
- **Flexible no die processing**
- **Low volume output**
- **Reduced process time, reduced prototype and development costs**

Utilizes information technology



2. Technological strength and competitiveness

Global market



P·46 NEXT: Chap. 7: Tasks for the forming machine industry going forward

Chapter 7: Tasks for the forming machine industry going forward

Tasks for the forming machine industry going forward

Establish a JAPAN brand and strengthen international competitiveness

Develop an international standard (internationalize JIS)

- Servo press international standard
- Safety standards
- Develop forming machine eco-products standard

Market strategy

- Domestic and overseas PR promotion of industry products (trade fairs, etc.)

10 years from now

Intellectual property strategy

- Establish intellectual property rights
- Counterfeit goods countermeasures

Industry-academia-government partnerships

- Effective use of public funding
- Strengthen partnerships

P·48 NEXT: Effective use of public policy supporting business

Major public measures in support of small and medium businesses

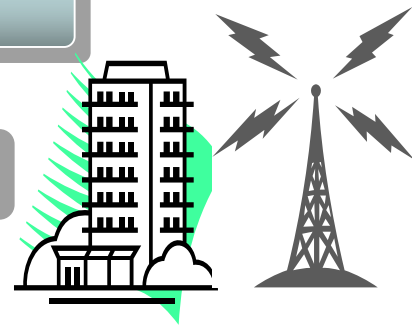
Effectively apply public support for businesses to developing eco-machines

Management Support	
● Project promoting strategic IT for small and medium business	Support developing company systems
● Strategic, high-level core technology support	17 key industry sector, including metal press processing, forming, and dies
● Project to support the Transfer of Key Small and Medium Enterprise Technologies	Software development accumulating and applying the skills of experienced technology, and expertise of experiences engineers
● Small Business Innovation Research (SBIR) program	Reduced patent fees and guaranteeing of debt when commercializing newly developed technology
● Tax program to strengthen small and medium business technology base	Special tax measures received when conducting testing and research
● Program to ensure small and medium business intellectual property rights	Support for a portion of the cost of special investigations performed overseas to determined the manufacturing and sales source of counterfeit and pirated product by small and medium business that have suffered intellectual property loss in overseas markets
● Small and medium business overseas business development support	Free advice from specialists. Provision of information. (Advice on internationalizing business)
● Small business equipment capital loan program	No interest loan of half of equipment purchasing costs
Credit support	
● Credit guarantee program association issues	When receiving loans from a financial institution, a credit guarantee a credit thereby making it easier to raise capital
Financial support	
● Tax program to promote small and medium business investment	Applies special tax measures when acquiring machinery, equipment and other infrastructure and capital assets

P·49 NEXT: Business-academia-government partnerships

Determining needs and developing seeds

Strengthen the partnerships of industry associations and manufacturers with academia and research institutions



- Automobile and electronics
- Steel
- Non-steel metals
- Universities, research centers, testing facilities
- The Japan Society for Technology of Plasticity
- Japanese Society of Die and Mold Technology

Forming machine industry

- Japan Metal Stamping Association
- Japan Auto Parts Industries Association
- Japan Dies Mold Industry Association
- Japan Electrical Component Association
- Electronic Industries Association of Japan
- Japan Forming Machine Association

Determine needs → **Develop seeds**

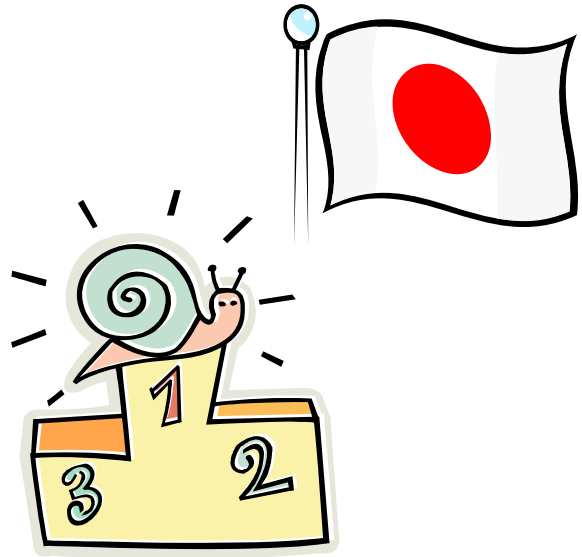
Eco-machine development ⇒
Enhanced international competitiveness

P·50 NEXT: An industry at full-potential in 10 years

The key to sustained industry growth: Taking the global lead in eco-machine development!!

A growing formed and fabricated materials industry

Industry vision: Outstanding international competitiveness



Developing and supplying eco-products

Enhanced industry value-added

Enhanced customer value-added

Reduced environmental burden

Win-Win

P·51 NEXT: Vision development committee members

JAPAN FORMING MACHINERY ASSOCIATION

Japan forming machine industry vision development committee members

	Name	Company (in Japanese alphabetical order)
Chairman	Enomoto Kiyosho	**Aida Engineering, Ltd.** **Director, Special Operating Officer**
Member	Nakano Takashi	**Aida Engineering, Ltd.** **Director, Development Head Office Forming Technology Center**
Member	Orita Naoki	**Amada Co., Ltd.** **Director**
Member	Hachiken Yukiharu	**Amino Inc.** **Sales Consultant**
Member	Nishikawa Yoshiaki	**Hitachi Zosen Fukui Corporation** **Tokyo Branch Manager**
Member	Komori Ryo	**Komatsu Ltd.** **General Manager, Industrial Machine Head Office Business Department**
Member	Murata Tsutomu	**Hoden Seimitsu Kako Kenkyusho Cp., Ltd.** **Development Project Section Processing Development GG Leader**
Secretariat	Sato Takehisa Matsumoto Kenji	JFMA Executive Director JFMA Executive Secretary