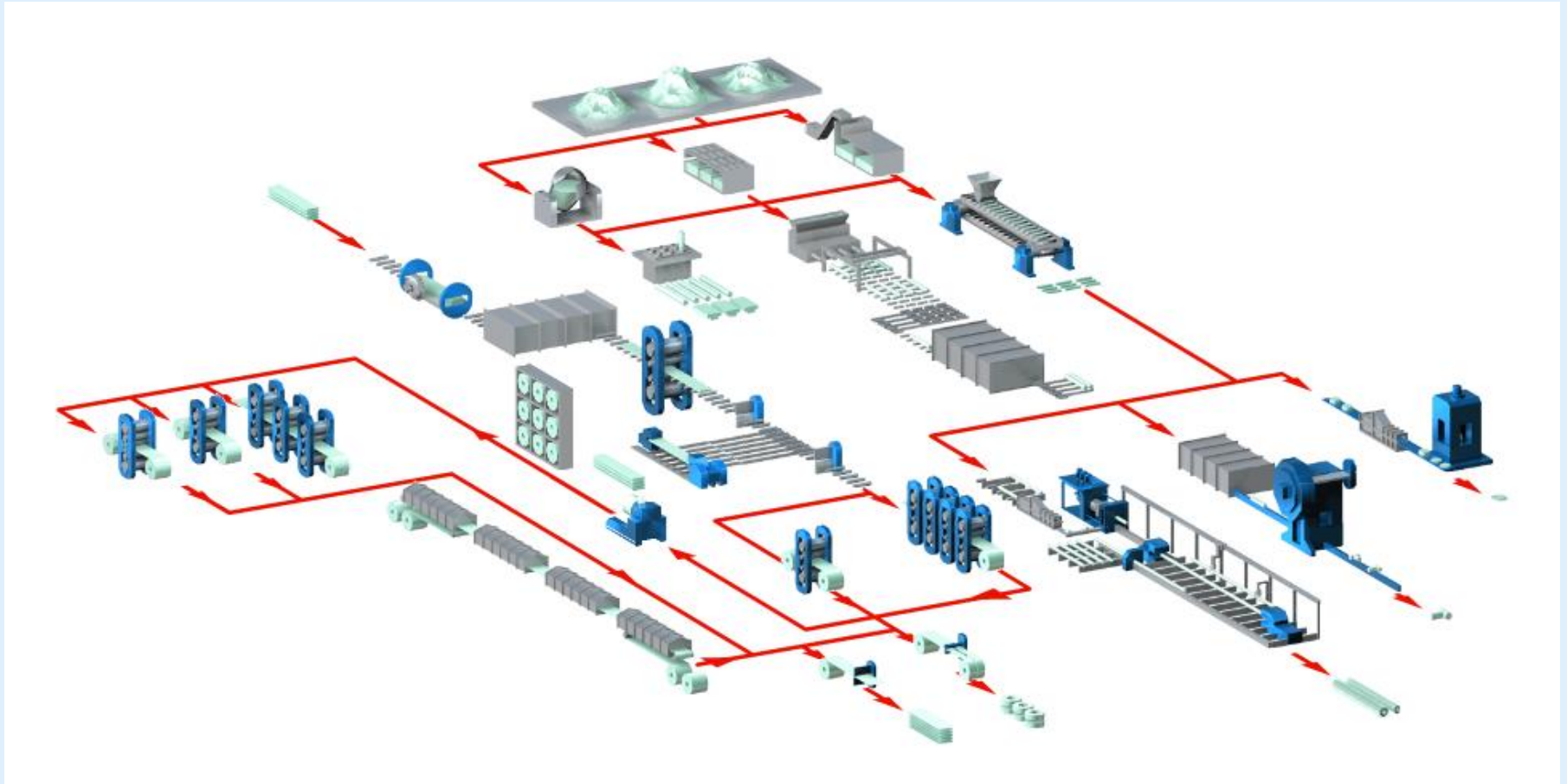


Forging Plants – Our expertise in Aluminium

Iran International Aluminium Conference, May 2016

Dr. Hansjörg Hoppe
Forging Plants
SMS group GmbH







Roughers for plates and hot strip
11 plants since 2000



Finishing lines for aluminum hot strip
11 plants since 2000



Cold Rolling mills
31 plants since 2000



Strip mills
2 plants since 2000



High rack warehouses
13 warehouses since 2000



Coating lines 14 plants since 2000



**Closed-die Presses
/ Powder Presses**

Copper Plants

Extrusion Presses

**Hertwich
Engineering**

**Open Die Forging
Presses**

**Ring and Wheel
Rolling Machines**

Eccentric-, Crank-,
Wedge Presses

Anode Casting Wheel

Extrusion Presses for
Light Metal

Melting Furnaces

Open-die forging
presses

Ring Rolling
Machines

Screw Presses

Continuous Casting
Plants

Extrusion Presses for
Heavy Metal

Casting Plants

Radial forging
machines

Ring Blank Presses

Forging- and Cross
Rolls

CONTIROP® Plants

Indirect Extrusion and
Tube Presses

Ultrasonic Testing
Plants

Manipulators

Ring Expanders

Automation and
Process Technology

Copper tube mills

Homogenizing Plants

Hydraulically Close
Die Presses

Axial Closed-die
Rolling Machines

Special Presses

Combined Drawing
Lines

Sawing, Stacking &
Packing Plants

Multiway Presses

Wheel Rolling
Machines and Lines

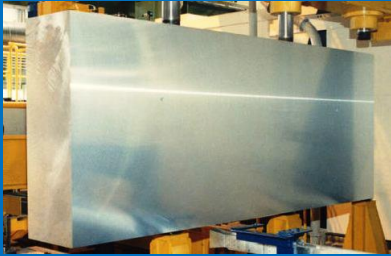
Powder Presses

Plate Stretchers

Ingot Scalpers,
Brazing Lines and
Band Saws



- Scalper, Band Saws, Brazing Lines
- Plate stretchers
- Extrusion Technology



Scalpers are installed in front of the hot rolling mill

- to remove the oxide skin and metallurgical impurities from the surface of the ingots.
- milling edges reduces scrap during hot rolling
- to avoid impurities of the working rolls

• Ingot Dimensions

- length up to 10.000 mm
- width up to 3.100 mm
- thickness up to 800 mm
- performance up to 1.000.000 t/a
- Chipping performance up to 11,3 kg/s
- Drive power up to 1.200 kW
- Highspeed-Milling up to 4.200 m/min



- Ingots in vertical position
- Ingots in horizontal position
- Two milling heads (top and bottom)
- Single milling head with turning table
- Combined milling heads for simultaneous processing of the edges and surfaces



Single or double band saw in Stand-Alone-Mode or integrated in blank-machining-centers for Cut-to-Length-Sawing of aluminium ingots

- with high sawing performance and reduced tool costs by use of disposable saw blades with extremely hard alloys
- higher flexibility than circular saws in terms of dimensions of ingot dimensions
- high feed rate
- notch only 1,8 mm (20 mm with circular saws), thus significantly minimized cutting loss (up to 90%)

- **Ingot Dimensions**

- length up to 10.000 mm
- width up to 3.500 mm
- thickness up to 800 mm
- performance up to 250.000 t/a
- Drive power up to 75 kW
- Highspeed-Milling up to 3.500 m/min





Fuselage and wing elements of aircrafts are made in integral design.

Semi-finished products, made of Al-alloys or titanium materials, are the initial shapes for this kind of design, which is further processed by milling (up to 90% chipping!) The milled parts may not be deformed, e.g. by straightening. Therefore, the used semi-finished products must be nearly stress-free

- Stretching (approx.3% - 4%) after rolling and heat treatment
- Safe, reliable wedge-shaped clamping systems
- effective shock absorbing systems for machine protection in case of a plate crack

• **Plates Dimensions**

- length up to **37.000 mm**
- width up to **4.300 mm**
- jaw opening up to **320 mm**

- **Stretching force up to 136 MN**

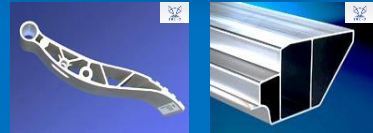




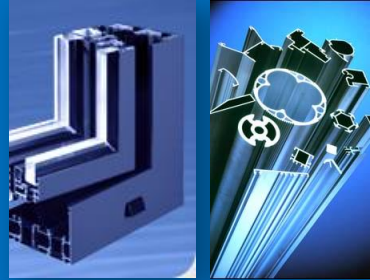
Extrusion Presses

Secondary Market Aluminium: a large number of applications with a variety of tasks

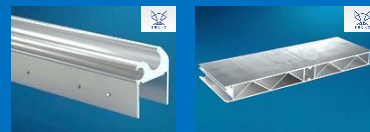
Automotive



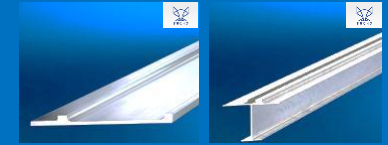
Construction Industry



Bus, Train, Ship



Aerospace





Frontloading Press

Nominal Force: 8 - 160 MN

Tube Press

Nominal Force: 8 - 160 MN

Special Press

Indirect Extrusion (Rod and/or Tube)

Direct/Indirect Extrusion (Rod and/or Tube)

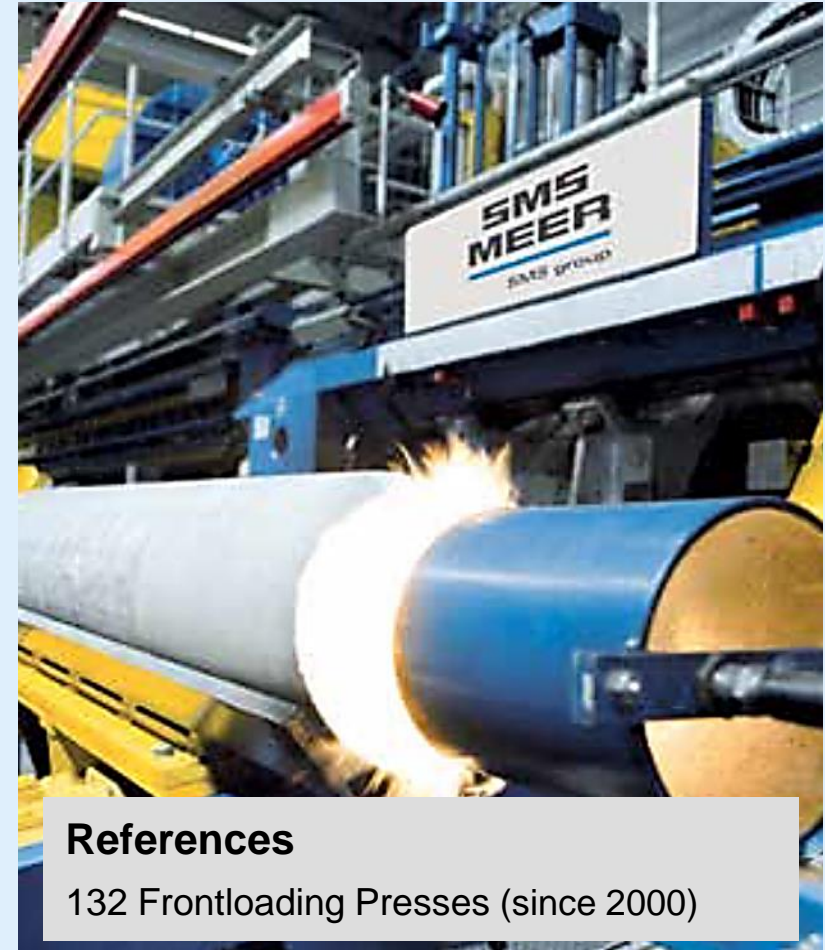
Special Applications

Main technical data – Light Metal Extrusion Presses

Frontloading press		
Nominal extrusion pressure	8 - 160	MN
Container diameter	133 - 800	mm
Max. billet length	630 - 2,500	mm
Max. section circumference diameter	140 - 800	mm
Min.- Max. extrusion speed	0.1 - 30	mm/s

Typical Products

Extrusions for automotive-, building-, railway-, aerospace industries



References
132 Frontloading Presses (since 2000)

Main technical data – Heavy Metal Extrusion Presses

Direct extrusion presses	Common values	
Nominal extrusion pressure	8 - 60	MN
Container diameter	100 - 400	mm
Max. billet length	450 - 1,500	mm
Max. section circumference diameter	125 - 320	mm
Max. extrusion speed	40 - 300	mm/s

Typical Products

Extrusions out of copper, brass, stainless steel, titanium, zirconium



References
16 Direct Extrusion Presses (since 2000)

Main technical data – Indirect Extrusion Presses

Indirect Extrusion Presses	Common values	
Nominal extrusion pressure	16 - 60	MN
Container diameter	180 - 800	mm
Max. billet length	1,180 - 2,400	mm
Max. section circumference diameter	155 - 280	mm
Max. extrusion speed	46 - 59	mm/s



Typical Products

Extrusions out of

- hard aluminum alloys,
- brass
- special alloys

References

28 Indirect Extrusion Presses (since 2000)



Short Stroke Frontloading Press 150 MN with Piercer Device for Seamless Tubes

Referencec for Tube Extrusion Presses since 2008

■ 28 MN	Qinghai Guoxin	China	Indirect Piercer Press for Aluminium
■ 55 MN	Qinghai Guoxin	China	Indirect Piercer Press for Aluminium
■ 60 MN	TISCO	China	Direct Piercer Press for Steel
■ 60 MN	Baosteel	China	Direct Piercer Press for Steel
■ 35 MN	CMP	Ukrainia	Direct Piercer Press for Steel and Zirconium
■ 36 MN	Yankuang	China	Indirect Piercer Press for Aluminium
■ 55 MN	Yankuang	China	Indirect Piercer Press for Aluminium
■ 150 MN	Yankuang	China	Direct Piercer Press for Aluminium
■ 45 MN	Jilin Liyuan	China	Direct/Indirect Piercer Press for Aluminium
■ 55 MN	Otto Fuchs	Germany	Direct Piercer Press for Aluminium
■ 11 MN	Nanshan	China	Direct Piercer Press for Aluminium
■ 11 MN	Nanshan	China	Indirect Piercer Press for Aluminium
■ 36 MN	Northwest Alu	China	Indirect Piercer Press for Aluminium
■ 60 MN	Jilin Liyuan	China	Direct Piercer Press for Aluminium

Referencec for Tube Extrusion Presses since 2008

■ 28 MN	Constellium	CZ	Indirect Piercer Press for Aluminium
■ 28 MN	Shandong Innovation	China	Indirect Piercer Press for Aluminium
■ 36 MN	Jilin Liyuan	China	Direct/Indirect Piercer Press for Aluminium
■ 25 MN	Sarbak	Turkey	Direct/Indirect Piercer Press for Brass
■ 14 MN	Güzel	Turkey	Direct /Indirect Piercer Press for Brass
■ 12,5 MN	Helvex	Mexico	Direct /Indirect Piercer Press for Brass
■ 40 MN	Western Energy	China	Direct Piercer Press for Steel and Zirconium (Erection/commissioning started)
■ 36 MN	Hexing Aviation	China	Indirect Piercer Press for Aluminium (Erection start summer 2016)
■ 50 MN	SeAH	Korea	Direct Piercer Press for Steel (Erection start summer 2016)
■ 50 MN	Buntmetall	Austria	Direct Piercer Press for Copper Alloys (Erection start 2017)
■ 25 MN	Diehl	Germany	Direct Piercer Press for Brass (Erection start 2017)

Highlight – Light Metal Extrusion Presses



- Reducing dead cycle times by approx. 30%
- Minimizing energy consumption (by 25 to 50%)





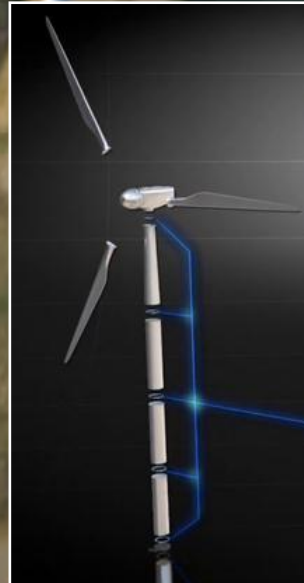
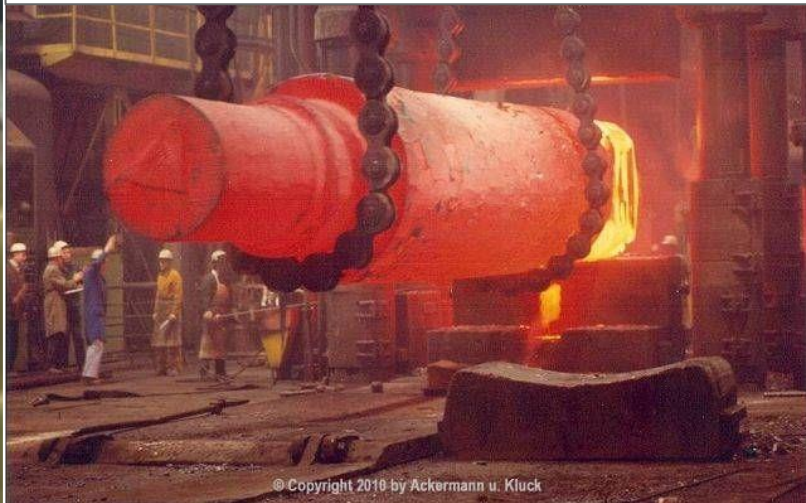
Customer demands

Markets with common customer demands Some examples

Markets	Closed-die Presses / Powder Presses	Copper Plants	Extrusion Presses	Hertwich Engineering	Open Die Forging Presses	Ring- and Wheel Rolling Presses
Railway Industry						
Aero + Space Ind.						
Automotive Ind.						
Energy Industry						
Chemical Industry						
Machine Eng. Mar.						
Heavy Industry						
Building Industry						
Tool Industry						
Aluminum Industry						

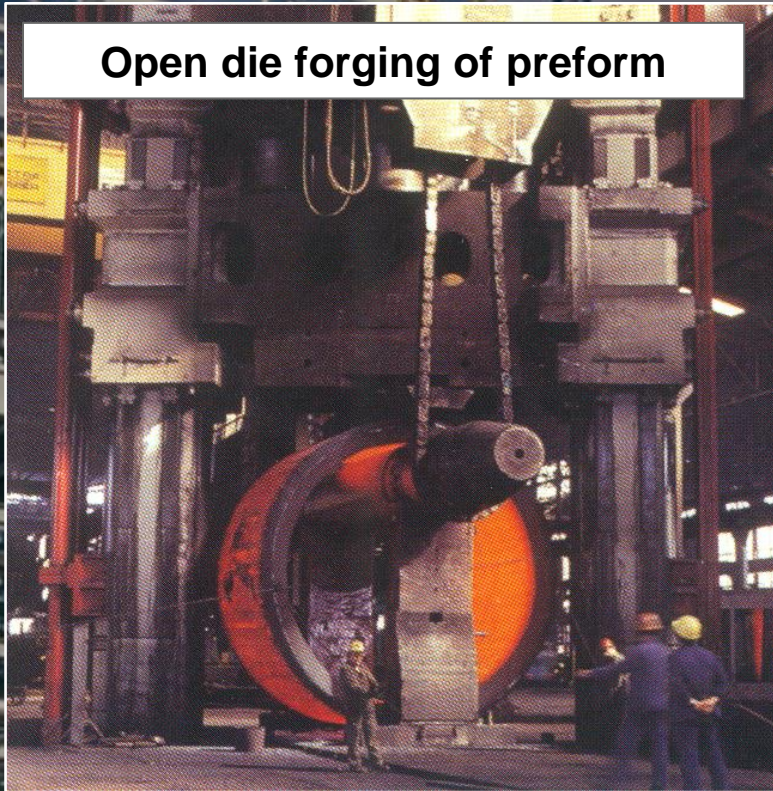
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Open die forging of generator shaft



Ring rolling of tower flanges





Closed-die forging of turbine blades



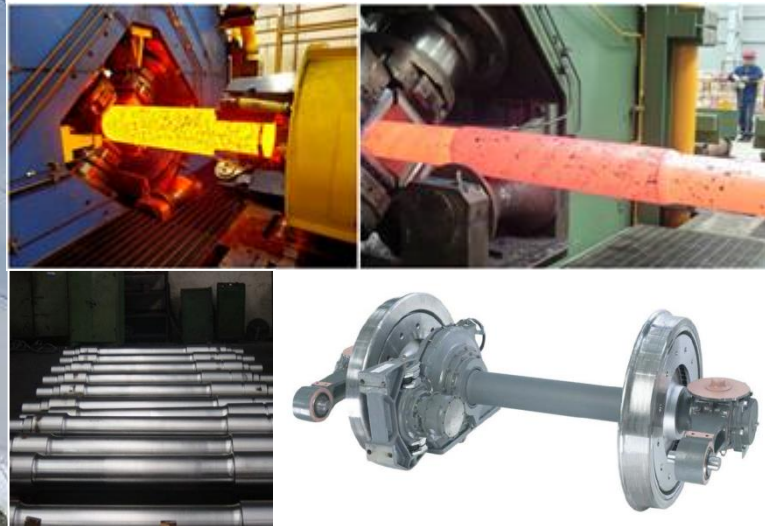
Ring rolling of turbine case



Forging & rolling of railway wheels



Radial forging of wheel shafts



Extrusion elements for wagon construction





MEETING your EXPECTATIONS