

**MCEB**  
4 roll DIGITAL

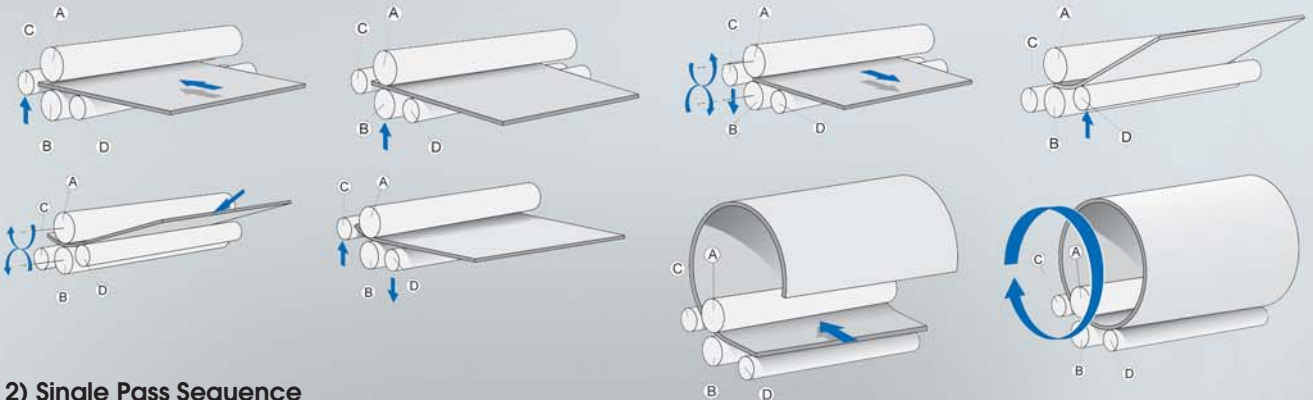
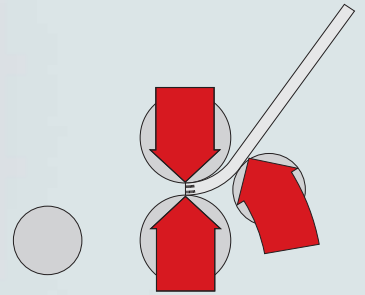
**DAVI**<sup>®</sup>  
EXCELLENCE IN FORMING

[www.davi.com](http://www.davi.com)

WHY CHOOSING  
A 4 ROLL ?



1) **The flat end is the shortest** (excellent prebending) thanks to the two central rolls that can take the edge to the precise tangent clamp.



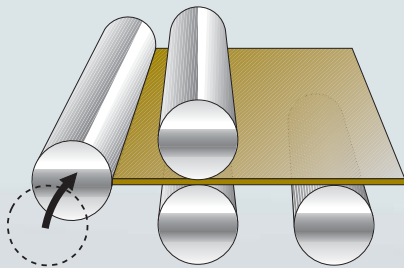
2) **Single Pass Sequence**

The entire shell could be finished in one pass only, including prebending of both edges.

ONE only side roll position, one only **automatic** squaring, and no plate handling required at all.

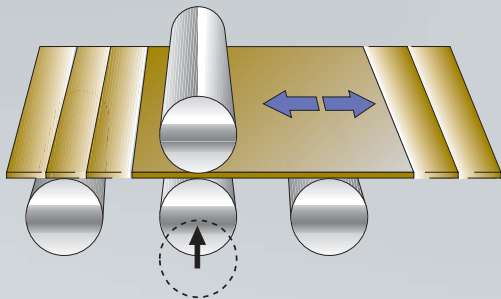
### 3) Squaring

Automatic and instantaneous, plate is squared against the back roll (a real hydraulic back-gauge).



### 4) Plate Transfer

Plate is always hydraulically pinched in between the 2 central rolls, constant and perfect positioning.



### 5) Handling Devices

Squaring, pre-bending and rolling can be made whilst keeping the plate always horizontal at the feeding: possibility to have gantry loaders and in-feed conveyors to improve productivity.



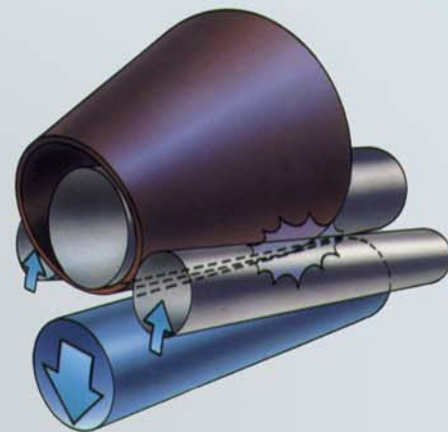
### 6) Cones

The 4 roll geometry helps to roll cones, as the bottom clamping roll can be tilted and clamps the back edge of the plate (at the large diameter of the cone), feeding faster its long development.

The "cone attachment", at the contrary, guiding the shorter edge of the plate (at the tight diameter of the cone) to slightly rotate according with the cone geometry, slows down the feeding of its shorter development.

Side rolls must be tilted to form the cone at its right geometry.

Davi 4 roll have, as standard feature, the electronic bottom clamping and side rolls tilting, up to a level substantial higher than the competition (Davi exclusive and benefit).



### 7) CNC Applications

4 roll is the most suitable machine for CNC: instant automatic squaring: reliable "start" position, ideal to be CNC programmed, as positive mechanical reference. The feeding of the plate is guaranteed by the hydraulic permanent clamp of the pinching rolls ensuring a constant, accurate and sure control of the position of the plate.

Single pass bending process: the simplest to be CNC programmed.



WHY CHOOSING A 4 ROLL  
DAVI "MCB"



DAVI MCB: THE RIGHT MACHINE  
FOR ANY BENDING  
REQUIREMENT



LARGE BAR AND FLANGES ROLLING MACHINES



BOILERS AND HEAT EXCHANGERS



TUBE AND PIPE MANUFACTURE UP TO 12 METERS LONG



MCB ROLLING MACHINE  
6.000 X 50 MM



CONICAL SHAPES



SHELLS FOR TRUCK CARRIAGES AND LIQUID CARRIERS

### CNC DAVI "SMART-PRO"



Recommended to users that need to program as simple as possible single radius parts.

This innovative CNC, thanks to its powerful Intel Pentium® processor, is **selfprogramming, complete automatically**, through the "Computer Program Mode" any single radius shape (the multi radii parts can be programmed Teach-in or in Editor mode).

**Unlimited number of axis** can be controlled (open system);

**Multiple Serial Ports:** two USB, RS232, Ethernet, compact flash slot;

**Advanced diagnostic:** with dedicated software and comprehensive trouble-shooting guide;

**Advanced Tele-service:** technical support online in real time connecting with Davi Tele Customer Service.

**ALL DAVI CNC BENEFIT FROM THE NEW ROLL-BY-WIRE**

### CNC DAVI "LEONARDO®"

The New Leonardo®, is the most advanced CNC available today in the plate roll industry.

Its powerful Intel Pentium® processor **self-programs itself full automatically** (through Computer Program Mode) to roll either single radius than multi-radii parts (like oval, buckets, round-square, etc.) It allows to **import .dxf files** directly from the office, and **carries a real CAD station onboard**.

Package CAD-Creator-3D installed on-board, that allows the operator to design parts and roll them automatically (CAD-CAM);

Memory capacity up to **5000 programs**;

**Unlimited number of axis** can be controlled (open system);

**Multiple Serial Ports:** two USB, RS232, Ethernet, compact flash slot;

**Advanced diagnostic:** with dedicated software and comprehensive troubleshooting guide;

**Advanced Tele-service:** technical support online in real time connecting with Davi Tele Customer Service.





# INNOVATE TO IMPROVE

SIGNIFICANT IMPROVEMENTS IN PRODUCTIVITY ARE ONLY POSSIBLE WITH A HIGH-TECH MACHINE. THE MCB INCORPORATES ALL THE MOST RECENT TECHNOLOGICAL INNOVATIONS IN BENDING TECHNOLOGY AND ALLOWS USERS TO REACH PRODUCTION LEVELS HITHERTO UNTHINKABLE.



THE MCB IS IDEAL FOR HIGH PRODUCTION AND AUTOMATED BENDING



The R&D is able to customize the basic machine to interface with several automating accessories and make the line more effective in terms of reductions in down time, cycle times and number of resources required to manage the process.

MCB rolls to automatically form rounded tanks with multiple radii on trucks and automobiles.



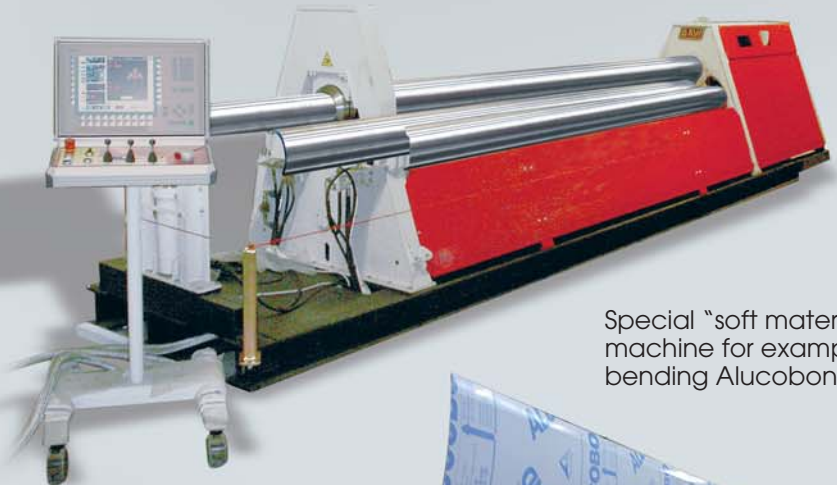
ING PROCESSES



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Vertical MCB machine.



Special "soft materials" machine for example bending Alucobond®.

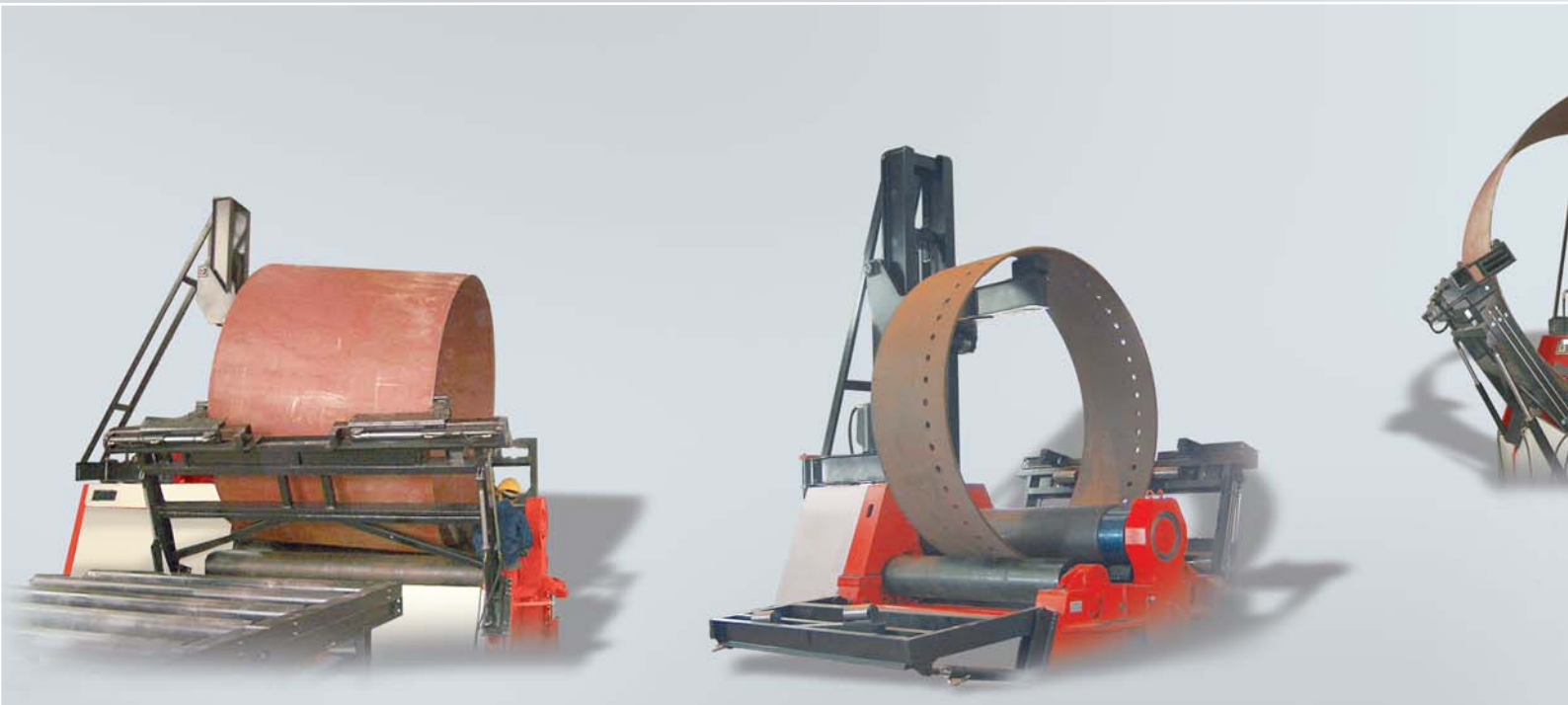






**THE MCB**

IS TODAY THE STANDARD WORLDWIDE FOR BENDING THICK PLATE (UP TO 300mm) IN WIND TOWER MANUFACTURING OPERATIONS.





# TECHNOLOGY RELIABILITY

Use of modern technological tools has allowed us to produce a product which combines reliability with simplicity this means very high precision in rolls positioning, crucial in the quality bending process.

TECHNOLOGY RELIABILITY

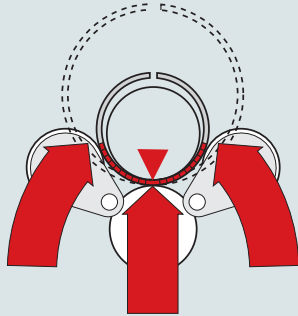
00 mm) and in high production environments such



## WHY CHOOSING A 4 ROLL DAVI "MCB" ?

### SWINGING GUIDES DAVI "PSG"

(1988 Davi patent on 4 roll machines):



The PSG system is based on the side rolls movement that is "hinged" on a strong central pin, the movement is therefore a circular movement around this central hinged point, without any linear friction at all.

Structure of the machine

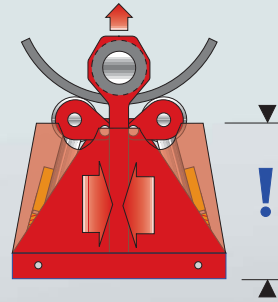
The natural external reaction of the plate during bending is "held" inside the structure.

This allows the machine to have a "compact" and less obtrusive structure, whilst at the same time maintaining its strength.

### NO DEFLECTION

Using the "PSG" system has enables the machine to "hold" the traction forces inside the structure, without any outside deflection.

Strength and precision with no friction  
The rolls movement is rigid and stable but at the same time "round" and fluid, the lack of friction

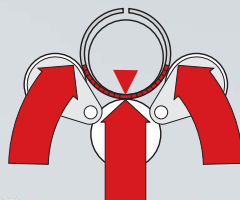
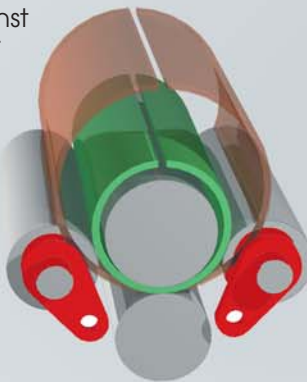


allows absolute accuracy.

Originally born from the concept of high precision planetary geardrives, that concept has today been adopted by all modern hightech rolls manufacturers (e.g. Scandinavian and German) and on practically all reputable brands of section benders.

### SMALL DIAMETER SHELLS

"Wrapped around" whilst "pressed" against the top roll, on a longer plate section than on the linear guides, reducing the natural material spring-back reopening effect. Much smaller diameter shells (and cones) are achievable (up to and even less than 1.1 times the top roll diameter), this means a 30% advantage in minimum diameter, when compared machines with linear guides.



### NO Lubrication



### DAVI SWINGING GUIDES



They completely eliminate the slipping sliding friction for side rolls movement.

No need of maintenance at all

They are not damaged by the mill-scale.

Premature wear due to the lack of regular maintenance is eliminated.

They extend the life of the machine and increase its value through the time.

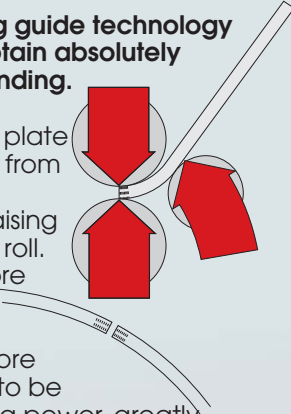


## ADVANTAGES OF THE DAVI "PSG" SYSTEM

### 1) Best pre-bending (shortest flat end)

The DAVI planetary swing guide technology allows the operator to obtain absolutely the best results in pre-bending.

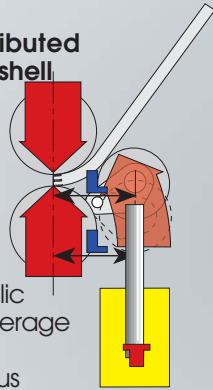
The side roll "rounds" the plate edge starting their stroke from a more external position, swinging up during the raising phase as it nears the top roll. The plate edge is therefore "pre-bent" and "rounded" with a higher leverage arm, getting more strength on the material to be formed, more prebending power, greatly reducing the remaining flat end. The edge is therefore free from angles, peaks or straight line segments between bends, thanks to the longer rounded section. The flat end remaining will be approximately 40-50% shorter than on other rolls with linear guides.



### 2) Greater Power is available (bending capacity of the machine)

Bending power increase is distributed homogeneously irrespective of shell diameters, even during pre-bending.

During the swinging movement the roll raises up with a beneficial and constant positive leverage. This geometric movement multiplies the power of the hydraulic cylinder thanks to the effect of leverage that concentrates all the bending power in the pre-bending area thus reducing the length of the flat end.



$$T_{\text{ONS}} \times L = P_{\text{OWER}}$$

### 3) Tighter diameter cones are possible

The swinging guides allow you to keep the created stress within the lower internal side of the frame. It is then possible to roll smaller diameter cones (much closer to the top roll diameter) as there is no interference from the geometry of the main frame.

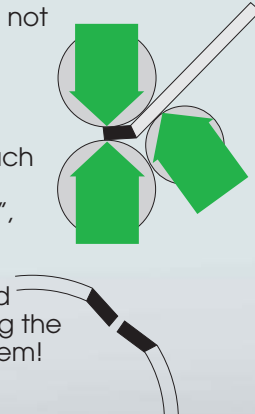


## DISADVANTAGES OF THE OLD LINEAR GUIDES

### Disadvantages of the old linear guides

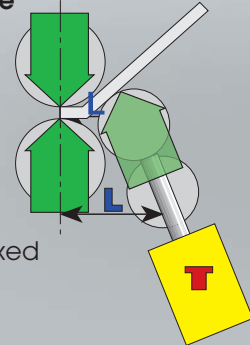
The linear guides (that do not "round" or "wraparound" the roll), press at a point which is closer to the clamping point:

- the bending stroke is much tighter: the pre-bending results in an edge "bend", with less power, rather than a "curved";
- the length of the flat end is double that when using the new swinging guide system!



### Disadvantages of the obsolete linear guides (still employed by other manufacturers).

Less power applied on small diameters and in the pre-bending area! Due to inclined straight line geometry of the machine, the power of the cylinder is fixed (no leverage benefit allows a constant load distribution). With inclined linear guides the max load is applied where it is less useful (with the rolls at the lowest down position).



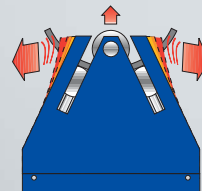
$$T_{\text{ONS}} \times L = P_{\text{OWER}}$$

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When the rolls raise the leverage reduces progressively, with lesser power reducing the forming diameters.

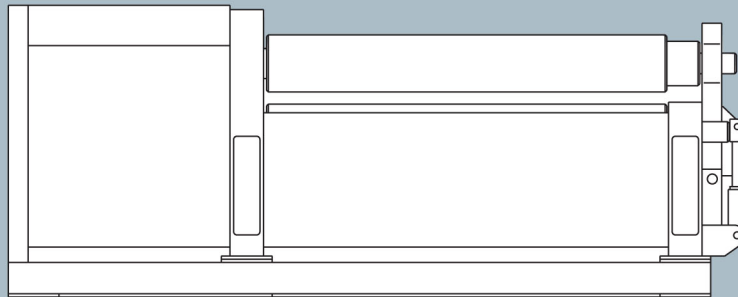
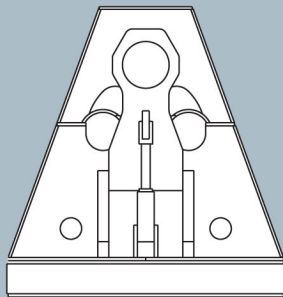
### Obsolete, previous linear guides

Linear guides for side rolls oblige a high and heavy frame to avoid it to deflect "out-board". This avoid to roll to tight cones because they can physically touch the high parts of the frame.



ADVANTAGES OF THE DAVI "PSG" SYSTEM





MCB	Rolls width	Rolling thickness	Prebending thickness	Top roll diameter	Bottom clamping roll diameter	Electric power
	mm	mm	mm	mm	mm	HP
2027	2050	20	18	270	250	25
2029	2050	24	20	290	270	25
2033	2050	32	28	330	310	30
2037	2050	42	38	370	340	40
2041	2050	50	42	410	370	60
2533	2550	22	18	330	300	25
2535	2550	28	25	350	330	30
2539	2550	38	32	390	370	40
2545	2550	46	38	450	410	60
3034	3100	20	16	340	310	25
3037	3100	26	22	370	350	30
3041	3100	35	28	410	380	40
3045	3100	40	32	450	410	60
3053	3100	54	48	530	490	75
3060	3100	70	60	600	550	100

\* Promau manufactures machines of all types and dimensions which, due to lack of space, cannot be published in full. Upon request, offers can be drawn up for machines of all performance levels; Promau in fact has the technical, design and production expertise to cope with any bending application.



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