



FIMI levelling philosophy.



FIMI has developed lines able to level high strength steel coils up to 1600 N/mm² (1.600 MPa) yield strength, reaching a perfect quality of levelling and a level of dimension of internal stress such as to meet the special requests related to laser cutting.

These excellent performances are possible thanks to the application of a levelling philosophy, which is based on the progressive contribution of several levellers in cascade, adjusted so as to produce a sort of tension levelling.

According to the production range, FIMI levelling and cut to length lines are equipped with a minimum of two machines, a pre-leveller and a leveller, up to a maximum of three machines, namely a pre-leveller with two levellers in cascade.

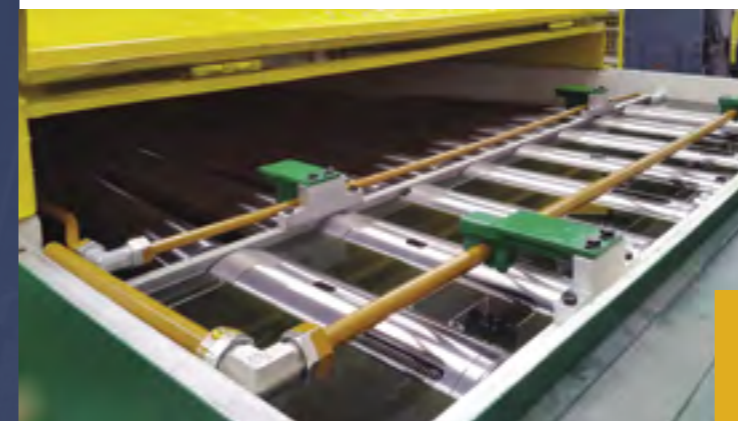
The application of a calculated tension between the machines gives a consistent contribution to the material plasticization. This working in tension of the Levelers takes advantage of FIMI's experience with tension levelling concept.

Highly advanced algorithms are presetting all the machines of the Line just inputting the material dimensions and yield strength. A powerful software with easy to understand HMI based on recalled flattening schedule stored in the system is the starting point for the operators to guide them in the process of learning and optimization. Moreover, self-learning features align FIMI know-how with our Customer's process philosophy.

Careful analysis and follow-up of the market demand together with a successful cooperation with our valued partners-customers has enabled FIMI to develop the state of the art process to level the strongest and thickest HSS with an astonishing ratio between investment and performances in term of quality, repeatability, availability, reliability and duration.

In addition, the long tradition in detail manufacturing accuracy and the specialized experience put FIMI at the forefront of cut to length lines process for ferrous and non-ferrous metals.

TDDS® - torque dynamic distribution system.



This is a FIMI patented system, already applied on several lines, necessary for levelling both high strength steel strips and non-ferrous strips with a very delicate surface.

The TDDS® is based on the application of special sliding couplings on each exit shaft of the drive unit distributor, as connecting elements to the shafts that transmit motion to the flattening rollers.

The couplings work in an oil bath, in a special tank, to ensure adequate lubrication and cooling conditions. They are made of special materials that guarantee the possibility of continuous sliding during the entire levelling process, rather than only occasional and sudden sliding when a certain high torque value is reached, as is the case with any sliding coupling available on the market with a protection function against torque overloads.

The purpose of this system is not primarily to protect mechanical parts from overloading (which is in any case a function intrinsically guaranteed by the system), but to obtain a sort of distribution of the levelling torque through all the working rollers and a sort of independence, in terms of

rotation speed, of each roll with respect to the others. In this way, each roll can assume its own speed, different from the other rolls, and dependent on the curvature of the strip being levelled in the area of contact with the roll itself. In addition, the torque required for levelling is shared quite homogeneously among all rolls, avoiding torque conflicts between the various working rolls and significantly raising the resistance limit of the processable material with the same diameter of the levelling rolls.

The result is no sliding between the working rolls and the strip surface, resulting in a much longer life of the working rolls and no scratches on the strip surface. The sharing of levelling torque among the rolls allows less power consumption (because all the rolls are giving a positive contribute for levelling without braking and fighting against the others) and the possibility to process materials with ultra-high strength mechanical properties that otherwise couldn't be processed by traditional levelling drive system, because the levelling torque through the most loaded rolls would break them.

levelling and cut to length line at a glance.

Strip Thickness Range **0,1÷25,4 mm (0.004"÷1")**

Max Strip Width **2.800 mm (9 ft)**

Max Sheet Length **18 m (59 ft)**

Max Yield Strength **2.000 N/mm² (MPa)**

Coil Weight up to **50 Ton (110.000 Lbs)**

During its 60 years of life, FIMI has developed an excellent expertise and know-how on cut to length lines, that nowadays can be summarized as follows:

- For Automotive applications.
- For cutting Trapezoidal Sheets and "Multiform".
- For "Multi-Blanking" applications.
- For High Strength Steel (HSS) & Ultra High Strength Steel (UHSS).
- For Heavy Gauge Steel up to 25,4 mm (1").
- For Tinsplate and Pre-Painted Sheets.
- For Stainless Steel, Aluminum and non-Ferrous Alloys.
- Combined Lines.
- Sheet to Sheet Levelling.
- Press Feeding Lines.

For Automotive applications



The cut to length lines for automotive applications are specifically designed to meet the needs of the surface quality and the narrow tolerances of the sheets dimensions demanded by automotive manufacturers.

The typical thicknesses range from 0,3 to 3,5 mm (0,012" to 0,14"), while the material processed is both steel (including HSS) and aluminium.

For cutting Trapezoidal Sheets and "Multiform"



This type of cut to length line is equipped with a special and innovative rotary shear, provided with tilting mould holders and an automatic mould-changing device.

This solution allows the assembly of equipment for various types of cut (rectilinear orthogonal and/or reclined for trapezoidal sheets or rectilinear for various templates). It is used both for carbon steel up to 3,0 mm (0,12") thickness and for aluminium up to 5 mm (0,2") thickness.

For "Multi-Blanking" applications



These are combined line configurations, equipped with a Slitting shear to cut the coil into strips (max 5 strips) and with a subsequent cut to length shear to cut the strips into sheets.

These applications are typical of the appliance and automotive industries.

For High Strength Steel (HSS) & Ultra High Strength Steel (UHSS)



Cut to length lines for Hot Rolled HSS and UHSS have been successfully developed to match the increasing demand of the market in reducing the thickness of the material while increasing its strength. Traditional cut to length configuration could never be able to process such HSS and UHSS material, so FIMI developed a special patented system, TDDS®, for leveller drives and a special multi leveller regulation and control system.

For Heavy Gauge Steel up to 25,4 mm (1")



Cut to length lines for Hot Rolled Heavy Gauge Steel are becoming more and more popular in the recent years, due to the increasing demand for heavy plates from coils for structural engineering, wagons, ships, etc. Also, these lines take advantage of the patented TDDS® system developed by FIMI for its levellers in order to remove smoothly the internal tensions of the material. In some special cases requested by the customers an Inline Skin Pass Mill can be added to the line for increasing the surface quality.

For Tinplate and Pre-Painted Sheets



These lines are characterized by solutions aimed at maximal productivity (process speed up to 180 mpm - 590 fpm), at maximum respect of the strip surface and the production of sheets with very strict geometric tolerances of width, length and squaring.

Sheet to Sheet Leveling



Our proven experience in Sheet-to-Sheet Levelling of high strength and heavy gauge steel is extended to aluminum: a single leveler is provided with 1 to 3 roller-cassettes to perform "laser cut quality leveling" of the wanted thickness range; cassette change is featured semi or fully automatic. Entry and exit pinch-rolls are to complete the leveler for sheet multiple & reversing leveling. Our expertise covers also Scale Brushing & Vacuum Cleaning which is a must to be considered when leveling high strength steel. Entry and Exit Roller Conveyors are designed to mate with the wanted sheet length.

Press Feeding Lines



It is a levelling line with a feeder + loop configuration for press feeding, typical application for the moulding of car body parts. These lines are characterized by high production capacity, maximum product quality both in terms of flatness and dimensional tolerance and in relation to the superficial respect of the strip, as well as by a high level of automation.

For Stainless Steel, Aluminum and non-Ferrous Alloys



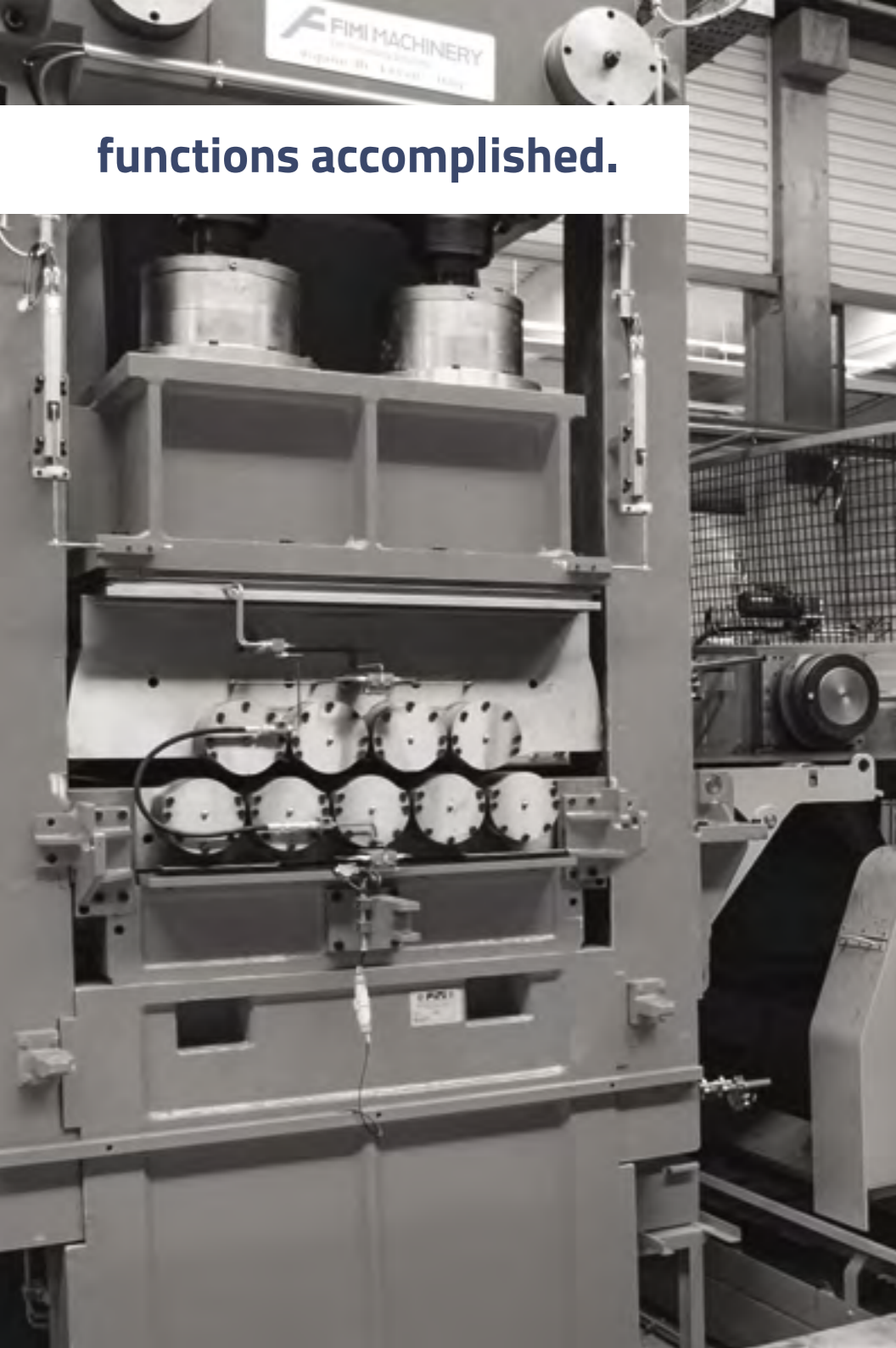
This kind of cut to length lines, either for thin or thick gauge material, are featured by machines, devices and technical solutions very much dedicated to the nature of this metal, the way it is produced in the upstream processes and its fields of applications; just for citing few of the matters to which attention is paid.

Combined Lines



These are implementations of cut to length lines either with the insertion of a recoiler upstream of the cut to length shear, to be able to rewind, totally or partially, the trimmed and levelled strip.





functions accomplished.



Entry Group

We design Coil Stocking and Coil Loading in a variety of solutions aimed to time saving to provide benefit for the production outcome.

- Coil stocking and automatic loading with vertical and horizontal centering.
- Automated strap removal devices, both off-line and on board of the decoiler.
- Devices of various configurations for opening the strip head.
- Static and dynamic strip centering with head straightening.
- Cropping, automatic cutting of head and tail and scrap handling.



Trimming

Our Edge Trimmers are designed in a variety of types & sizes to accomplish edge trimming of metal strips featuring different grades as ferrous and non-ferrous, range of gauges rather than strip widths, and material strengths.

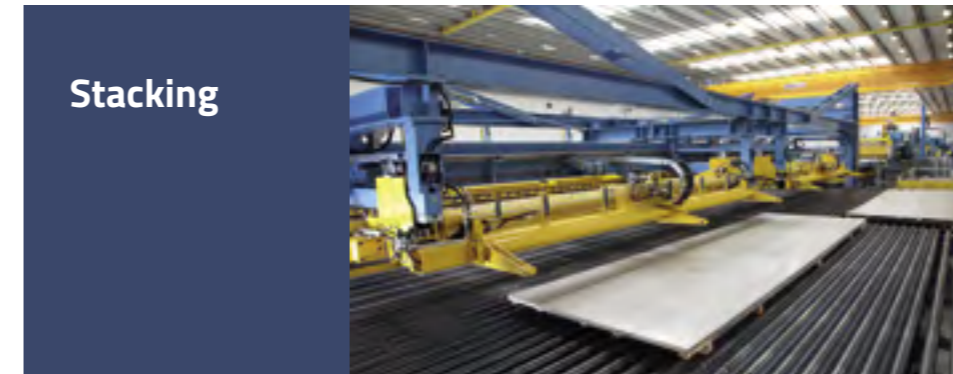
- Edge trimming from 0,1 to 25,4 mm (0,004" to 1").
- Possibility of integration with central cut.
- Scrap winders, to wind the scrap in coils/spools.
- High efficiency scrap cutters.
- Customized solutions for scrap handling.



Levelling

Levelling is the heart of the technological process of cut to length lines, and it is the function in which FIMI has dedicated the most research and development activity.

We have defined innovative solutions that represent the state of the art of the sector and that are absolutely essential in order to be able to process the modern materials, developed by the most advanced steel mills.



Stacking

Our Stackers are designed in a variety of types & sizes to accomplish perfect stacking of metal sheets featuring different grades as ferrous and non-ferrous, range of gauges along with different sheet widths and lengths.

- Vacuum stacker.
- Magnetic stacker.
- Air cushion stacker.
- Rackets stacker.
- Air cushion plus rackets stacker.
- Bomb doors stacker.
- Stacker for trapezoidal sheets.
- Vacuum plus rackets stacker.

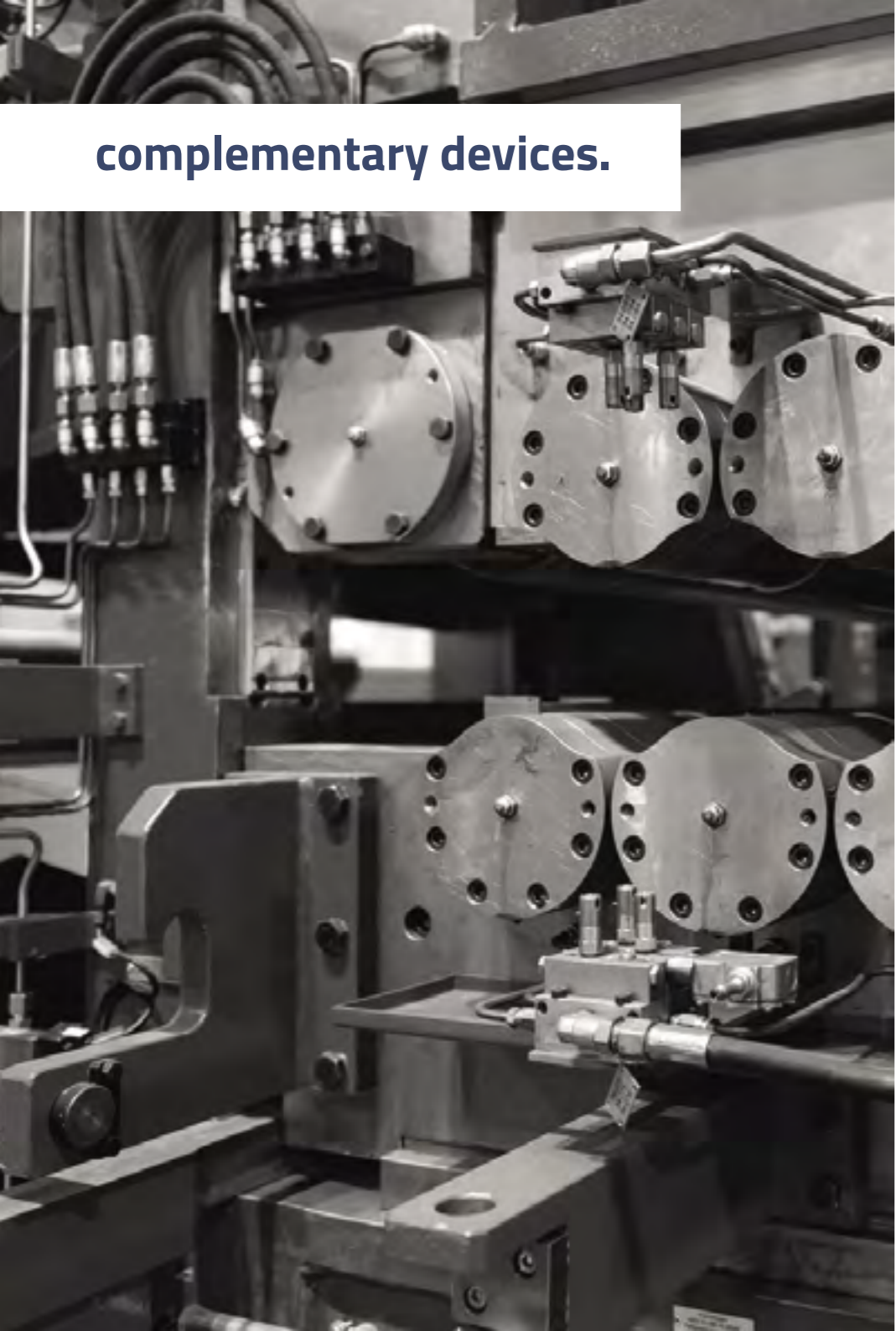


Cut to Length

Different typologies of shears are available to cut the coil into sheets, depending on the type of material to be processed and the production capacity required.

- Fixed and oscillating hydraulic shears.
- Fixed quick shear with fly-wheel and brake/clutch.
- Drum shear "Rotronic".
- Rotary shear "Vectronic" for strips up to 8 mm (0,3") thickness.
- Rotary shear "Transtronic" for strips up to 16 mm (0,63") thickness.
- Rotary shear for trapezoidal or shaped sheets.
- Flying shear up to 25,4 mm (1").





complementary devices.

**Paper
Recoiler**



**Automatic
Plastic Film
Application**



**Automatic
Paper
Application**



**Book Opening
Levelling
Cassette**



**Machinery
Tools Handling**



**Large Cassette
Overturning
Device for
Heavy Gauge
Levelers**



**Multiple
Brushing
System for
Scale Removal**



**Cleaning
of Strip and Rolls
for Levelling
Cassette**



**In-Line Sheet
Flatness &
Dimensions
Measuring
System**





FIMIGroup sustains and promotes the environment



F.I.M.I. - Fabbrica Impianti Macchine Industriali - S.p.a.

Via dell'Industria, 15 | 23897 Viganò (LC), Italy

Tel. +39 039 92141 | Fax +39 039 9272090

info@fimigroup.it | www.fimigroup.it

