MI.DA.® MINIMILL DANIELI

THE MOST COMPETITIVE WAY TO PRODUCE LONG PRODUCTS IN TERMS OF CAPEX AND OPEX

FACTS AND EXPERIENCES

UPDATE 6/2015
DANIELI MAJOR PLANT REFERENCES IN AFRICA

- Sonasid
- Intermetal SA
- Ezz Flat Steel
- Al Ezz Rebar
- Suez Steel
- Beshai
- Alfapipe
- Algerian Qatari Steel
- Lisco
- Al Asaad
- Abanoub Steel
- Metec
- Toussa Steel
- SMC
- Wempco
- African Commodities
- ASC
- Rabbi Steel
- Otavi Steel
- Scaw Metals
- Capegate
- Highveld
- Arcelor Mittal
Economically-sized to cover regional market demand
Danieli 2010 micromill makes a minimill smaller and more profitable.

Productivity ranges from 200,000 to 500,000 tpy of straight bars, wirerod and spooled coils.
The K factors

A winning strategy for the best integration of the most advanced technologies to allow our Customers to be the most competitive in long products production.
Traditional minimill: 24,500 m²
MI.DA.® micromill: 11,100 m²

LESS THAN HALF THE SPACE!
SAVE 13,400 m² (5 to 8 Mio / Euro)
Steel is always present in all stages of process, thanks to the matching of the various process steps (SCRAP > LIQUID > CASTING > ROLLING)....in less than 2 hours...
MI.DA.® 23-hours/day uninterrupted production means:

> Up to 40 continuous heats/day casting sequences

> 1 hour overall product change (rolls, rings, guides) and preventive maintenance

> Plant automation allows to switch from continuous casting and rolling to semi-continuous operation to accommodate for unexpected delays
- Longest billet ever rolled over 11,000 m in a single uninterrupted casting/rolling sequence
- No reheating furnace
- Significant savings in conversion cost (minus 75% natural gas)
From 200,000 tpy to 800,000 tpy with a total (cash + depreciation) cost lower than any other minimill up to or over 1 Million tpy.

The estimated competitive edge against the average performance of a traditional minimill is between 10% - 30%.

Cost advantages vs. traditional minimills

> Lower labor cost: 4-8 USD/t (less than 1 man-hour/ton)
> Lower natural gas cost: 4 USD/t (6-8 Nm3/h vs 26-28 Nm3/h)
> Higher yield > 99.7%: 6 USD/t (minimized material losses)
> Lower consumables cost: 3.5 USD/t
> Lower production cost: 8 USD/t (thanks to QTB & no alloys required in steel meltshop process)
> Lower inventory cost: 2 USD/t (no billets storage, minimized bundles storage)
> Higher revenue due to best bundles quality: 2 USD/t
> Lower freight cost: 10-20 USD/t (according to plant location and logistics)

TOTAL ESTIMATED SAVINGS OF APPROX 40 TO 54 USD/T
Thanks to the patented DRB “Direct Rolling & Bundling” system for 1 to 6 tons bundles:

> Straight bars cut to final sales length (any customized length) and bundled, directly at finishing mill delivery side
> Traditional cooling bed, cold cut-to-length and bar counting no longer necessary
> Extremely tight cut-to-length tolerances
THE ULTIMATE STEP FORWARD IN PRODUCTION OF COMMERCIAL STEEL LONG PRODUCTS

> **KFactor 1** MI.DA.® businessland  
> **KFactor 2** Saving thanks to super-compact design (50% less building space)  
> **KFactor 3** 2 hours from scrap to finished product  
> **KFactor 4** 23 hours uninterrupted production  
> **KFactor 5** 11,000 m longest 1,070 tons heaviest billet ever rolled  
> **KFactor 6** 1 to 6 ton bundles of highest quality ever seen  
> **KFactor 7** 13 months construction path  
> **KFactor 8** 40 to 54 USD/ton transformation cost saving
> Endless casting & rolling process
> Direct connection of the single strand FastCast CCM to the 1st rolling mill stand for uninterrupted production
> No reheating furnace; no consequent gas/fuel consumption
> Longest and heaviest billet ever rolled; over 1,000-ton uninterrupted casting & rolling sequence during the daily operative shifts
> Fastest casting speed ever achieved of 7.2 m/min (> 55 Tph per strand)
> DRB Direct Rolling & Bundling system (patented)
> Deformed bars cut to final sales length (any customized length) and bundled, directly at finishing mill delivery side
> Traditional cooling bed for multiple-length bars, cold cut-to-length and bar counting facilities no longer necessary
> Bar bundles of the highest quality ever seen in the market
> Excellent cut-to-length tolerances
CCM / RM link

- Speed control from mould to cooling bed
- Cascade control from mill impacts also on casting speed
- Speed changes do not affect product quality or cut accuracy
- Single pulpit for endless process control
QTB Plus

> Prediction and control of mechanical properties of hot rolled bars in real time
> Final quality under control
> On line analysis of strength and hardness of final product
> Control of shrinkage for optimum cut length
QTB Plus

> HiSPEED sensor to measure actual rolling speed
> Dedicated automation package for shears control
> High accuracy of cut (even in endless operation)
> Multidimensional data analysis system adding intelligence and information to the reports
> Better process and plant operation knowledge
> Easier decision making for plant managers

**MORE INTELLIGENCE**

Integrated information from SCRAP to BAR BUNDLE
DASHBOARD REPORTS

- Pre-configured and ready-to-use reports
- KPIs for assessment of plant performance
- Visualization of main parameters for heats, campaign shifts or any time period
DYNAMIC REPORTS

- Flexible and advanced display tools
- Trends, correlations and cause-and-effect relationships
<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td>Nominal plant capacity</td>
<td>Up to 300,000 tpy (shipped)</td>
</tr>
<tr>
<td>Hourly productivity</td>
<td>45 tph</td>
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<tr>
<td>Billet size</td>
<td>130 mm</td>
</tr>
<tr>
<td>Product size range</td>
<td>from 8 to 40 mm dia</td>
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<tr>
<td>Finished products</td>
<td>6 to 18 m long bundles</td>
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</tbody>
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Approx 270 m
Spooler line

- Ultra-compact coils up to 3.5 tons, custom weight
- Twist-free winding
- End-users save up to $20/ton due to increased efficiencies
Wire Rod line

> Coils up to 3 tons
> 5.5 to 16 mm dia.
> Possibility to customize coil weight
10 month learning curve
OUR MOTTO: WE MAKE THINGS HAPPEN!
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