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7. Uluslararası Ankiros Döküm Kongresi

«Increase Your Casting Output with Higher Productivity on Vertical Mouldin Machines From DISA»

«DISA Dikey Kalıplama Hattı ile Yüksek Verimlilik ve Üretimi Artırma»

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3.Oturum: Döküm Teknolojileri Demir - Çelik

3rd Session: Casting Technologies Iron - Steel

Oturum Başkanı/Session Chairman: Seyfi Değirmenci (Componenta Döküm. Tic. San. A.Ş.)

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Increase your casting output with higher productivity on vertical moulding machines from DISA

Presented by Bo Haugbølle

Presentation content

- How to produce castings vertically
- How to increase productivity and available pouring time on a vertical machine
- Benefits of producing castings on vertical machines
- Case story from a customer with higher productivity than regular vertical moulding process
- Lower your cost per casting with DISA
- Advantages of the DISA Vertical process vs. Horizontal flask lines
- Changing from horizontal to vertical process
- Case story from a customer changing from horizontal to vertical process

How to produce castings vertically?

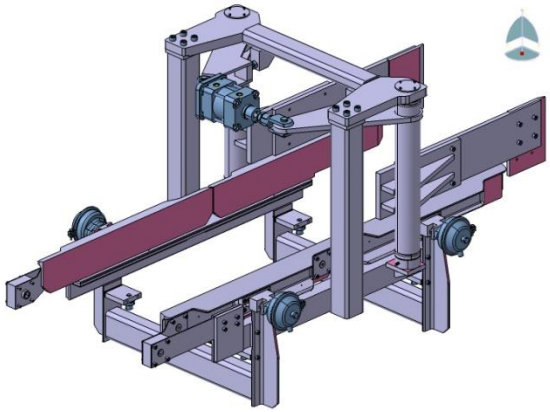
DISA started in the 1960'ies with our vertical machines!

At that time we started with 6 operations (steps) – Today, vertical moulding is much more than that!

How to increase productivity and available pouring time?

Double Index System (DIS)

- Enables the moulding line to transport two moulds at the same time



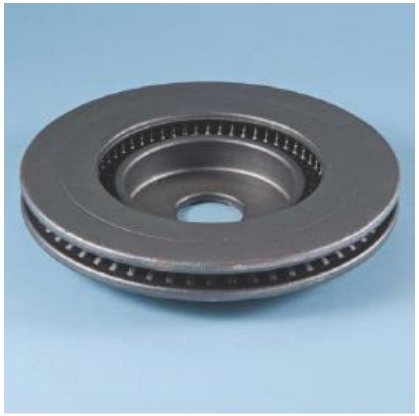
Features:

- Higher productivity (Up to 30% increase)
- Longer pouring time (+40% - when two moulds are poured simultaneously)
- Less kilos per second poured (higher casting quality)

How to increase productivity and available pouring time?

Example:

Disc properties used for design point:



- Ventilated, Ø280 mm, weight 8.5 kg
- Expected to be without feeders
- In-mould cooling time 40 - 45 minutes
- DISA: Recommended pouring rates for brake discs:
  - Normal 3.5 kg/s – 4.5 kg/s (3 kg/s – 5 kg/s)
  - Lower than 3 kg/s: D graphite on top cavities, gas defects etc.
  - Higher than 5 kg/s: sand inclusions etc.

How to increase productivity and available pouring time?

Example from before, made on a DISA 231-X/FAST:

Description:	Std.	DIS
Castings in each mould	2	2
Poured weight	23kg	23kg
Pouring speed	4,5kg	**3,7kg**
Pouring time needed	5,1 sec	6,3sec
Moulding speed incl. cores	465mph	**465mph**

Benefits of producing castings on vertical machines

Why do the leading foundries worldwide use a DISAMATIC when producing brake discs?

- To meet customer and market demands for:
  - High speed up to 555 moulds/hour (un-cored)
  - Precision of max 0,1 mm mismatch
  - Excellent casting integrity
  - Optimum production uptime
  - Less than 50% maintenance costs compared to flask lines
  - Minimum manpower required
  - Fast, precise automatic core setting
  - Overall cost optimisation
  - Reduce energy consumption

Case story customer with higher productivity than normally

Customer name: Suzhou Ishikawa Iron Manufacturing Co. Ltd. (SIIM)
Place: Suzhou, China (Near Shanghai)
Yearly output: 72,000 Tons castings
Main production: Ductile Iron for railway and Automotive sector

Lower your cost per casting with DISA vertical moulding

Production line configuration at SIIM:

- DISA 231-X with Double Index System & DISA SBC shuttle system
- 2 Pouring units on one DISA moulding line

Goals achieved by SIIM with double index system:

- 30 % productivity increase
- Higher casting quality, by pouring less kg/sec

"The double index mould transportation system means that pouring time can be extended while the DISA 231-X is running at high sped, giving us an average productivity boost of up to 30 per cent, "Mr. Gaishi Shiotani continues"

Double Index status

Status – April 2014:

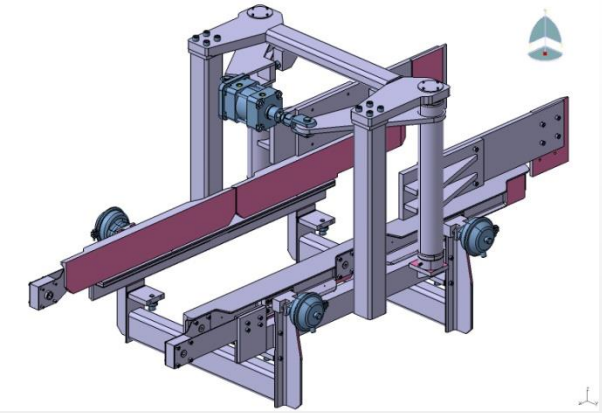
Installed at the following customers:

1. SIIM, China – DISA 231-B, running in daily production
   - 30% higher productivity on heavy castings

2. Brakes India, India – DISA 240-C
   - Made recent trials with DIS

Sold to following customers:

- Eurac, Czech Rep. – DISA 231/FAST-X
- Amtek, India – DISA 250-C



Advantages of the DISA Vertical process vs. Horizontal flask I.

Feature	Horizontal	Vertical
Production (m/h)	Lower	Higher (up to 555 m/h)
Productivity (Tn/hh)	Lower	Higher
Automation (Pouring, Peripherals, etc.)	More difficult	Easier
Lay-out	More complex	Easier
Investment	Bigger	Lower
Maintenance cost	Higher	Lower (≈ 1/4 ÷ 1/8)
Up-time	Lower	Higher (≥ 98%)

Advantages of the DISA Vertical process vs. Horizontal flask I.

Feature	Horizontal	Vertical
Sand/Metal relation	Variable	Adjustable (≈constant)
Dimensional tolerances	Higher	Smaller
Mismatch	Higher	Smaller
Shake-out	More difficult	Easier
Machine operations	More (More complex)	Less (Simple. No flask)
Process	More complex	High capability (Cmk, Cpk)
Core setting	Normally manual	Automatic and high precision CSE

Changing from Horizontal to vertical process

Recipe:

1. Evaluate casting dimensions
2. Find a suitable vertical machine
3. Get a loading study, to determine production time, melting capacity etc.
4. Evaluate existing pattern shop
    a. Is the pattern mounted, inserted or fixed?
    b. Measure existing pattern size
    c. Does it use ½ or ¼ cassette pattern plate system?
5. Go through the core shop with the customer; can the existing cores be used vertically? if not: can the core box be modified?
6. If customer has doubts about the vertical process, trial production in another foundry could be agreed as an option.

Advantages of the DISA vertical process vs. horizontal flask I.

Foundry name: Industrias Hergom S. A.

Place: Near Santander, Spain

Main products: Stove castings (own products)

Production start: In the 1960'ies

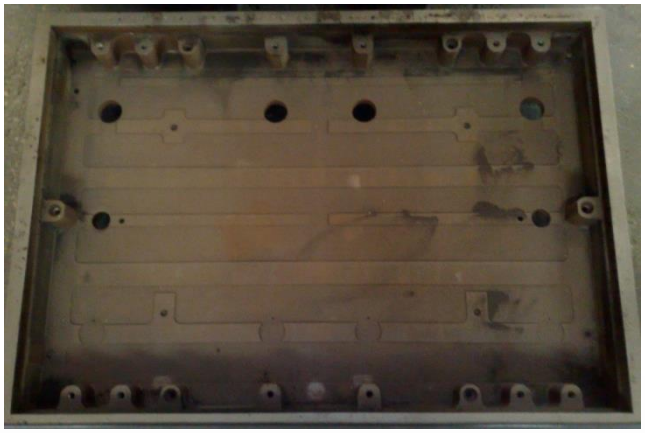
Changed production method in 2003 from horizontal flask line to DISA 280-B (1200x850) Vertical, - main savings:

- Man power
- Productivity increase
- Maintenance cost decreased

Advantages of the DISA vertical process vs. horizontal flask I.

Customer case story – Hergom, Spain:

Pattern conversion:



DISA bolster plate for flask line pattern plates

Fireplace roof placed into DISA bolster

Fireplace roof casting

Advantages of the DISA vertical process vs. horizontal flask I.

Customer case story – Hergom, Spain:

Example:

Productivity is the biggest improvement when changing from flask horizontal moulding line to vertical flaskless moulding line.

Hergom experienced, moulding line **productivity up 220%**.

Italian moulding line average production was ≈110 moulds/hour with maximum of 140 m/h.

At 280-B Disa line average production is **245 m/h with maximum of 305 m/h**.

Productivity has also increase due to reduction of number of persons and DISA up-time is better than the flaskline up-time.