Eddy Current reduction with reasonable costs using Snakeline Magnets

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UK Magnetic Society

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Agenda

- Introduction to Bomatec
- Current Challenges in Motor Design
- Eddy Currents & Snakeline Magnets
- Customer Experience

- Established 1993
- Privately owned
- Global Presence
- 5 Locations
- 300+ Employees
- IATF 16949 certified

Bomatec International Corp.
North America

Bomatec AG (HQ)
Europe

Bomatec (Malaysia) Sdn. Bhd.
Asia

Bomatec (China) Co. Ltd.
Asia

Bomatec (Malaysia) Sdn. Bhd.



Factory 1

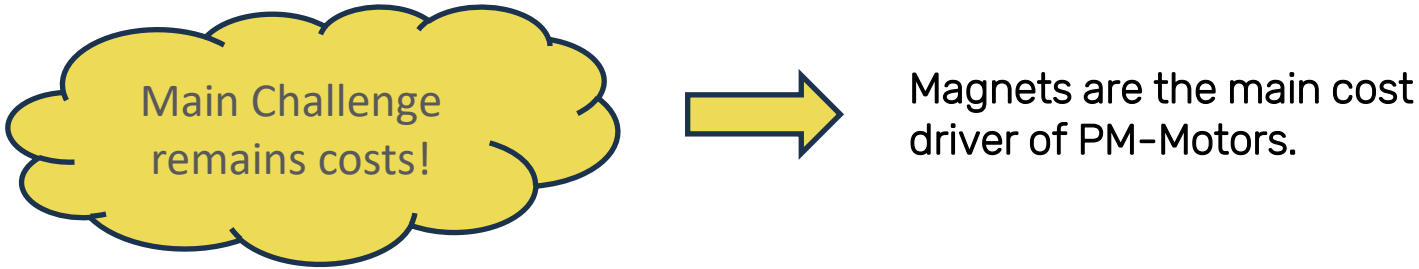
Facts

- Established: 1993 (Takeover 2014)
- Location: Klang, Malaysia
- IATF16949
- Plastic injected magnets and magnet assemblies
- Employees: 270

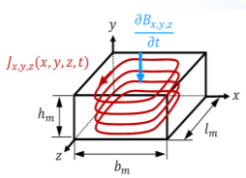
Factory 2

Current Challenges in Motor Design

- After 2035 only zero-emission cars will be allowed in the EU
- Car engines get stronger and stronger (+16% over last 10 year)
- Due to higher efficiency induction motors will be replaced by PM-motors
- Until 2030 up to 15% of magnets need to be recycled in the EU



One Source of High Costs: Eddy Currents

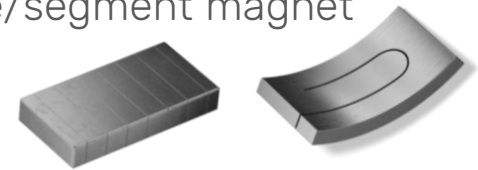


Source: *ProFEMAG AG*

Eddy Currents → Heat = Losses → Lower Performance

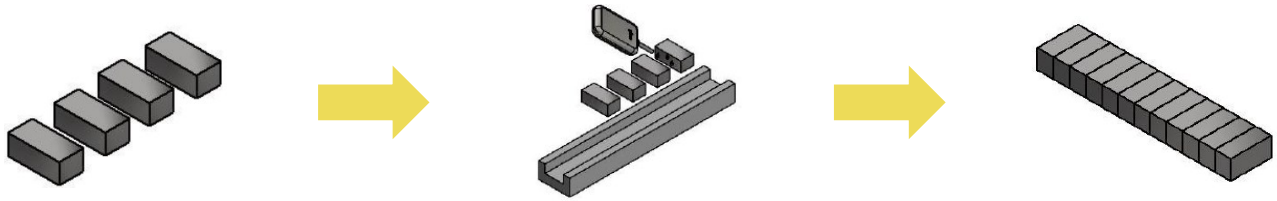
Accept = higher grade material

Mitigate = laminate/segment magnet

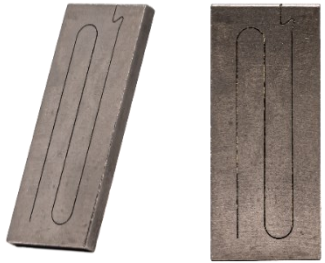


Main Reason for Snakeline Magnets are the costs.
Segmenting a magnet comes with high costs (+10 – +100%).

Grinding and shaping → Gluing → Grinding

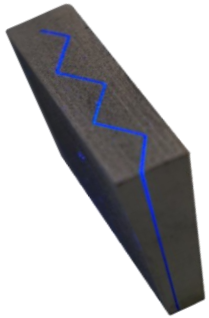


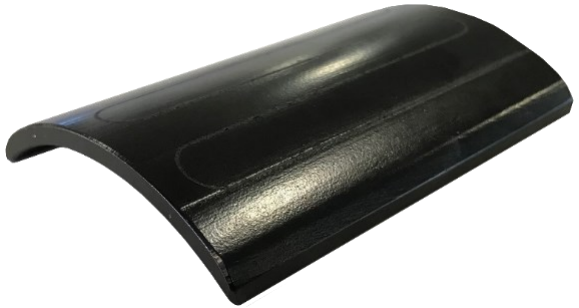
Snakeline Magnets – Properties



Shapes

Some Examples

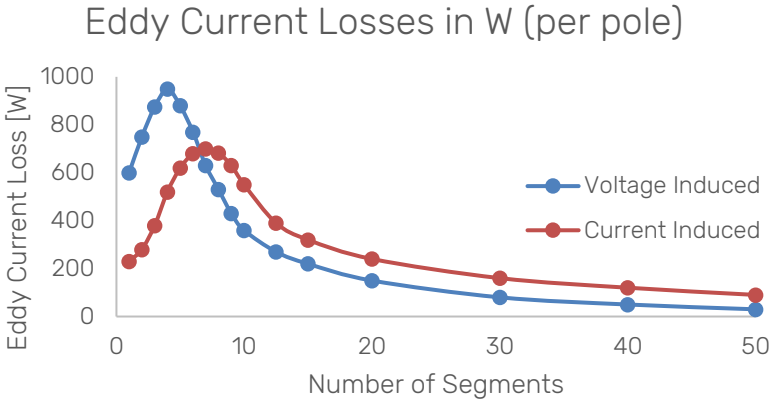




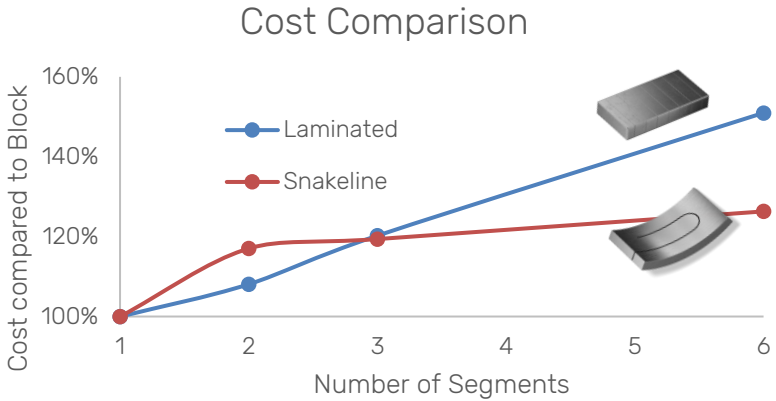
Eddy Current Reduction Approach

- Reduced costs
- Increased efficiency
- Flexible design

Analysis of losses

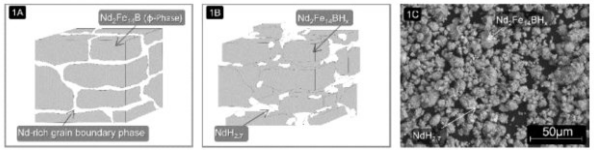


Analysis of costs

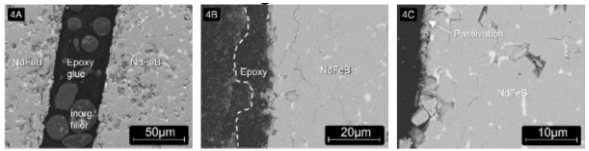


Recyclability of Segmented Magnets

- Big source for recycled magnets will be EOL-EV's
- Different recycling approaches already under development (HyProMag, HS Pforzheim)
- So far Segmented Magnets cannot be recycled! [1]
- Unfilled Snakeline magnets have a potential to solve this challenge



Example of HPMS (Hydrogen Processing of Magnetic Scrap) [1]



SEM Images of Segmented Magnets [1]

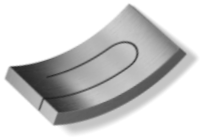
[1] Processability and separability of commercial anti-corrosion coatings in HPMS recycling of NdFeB, September 2023, Laura Grau, HS Pforzheim

What we have seen

Magnets are critical and a high-cost factor

Eddy currents are complex

Laminated magnets cannot be recycled



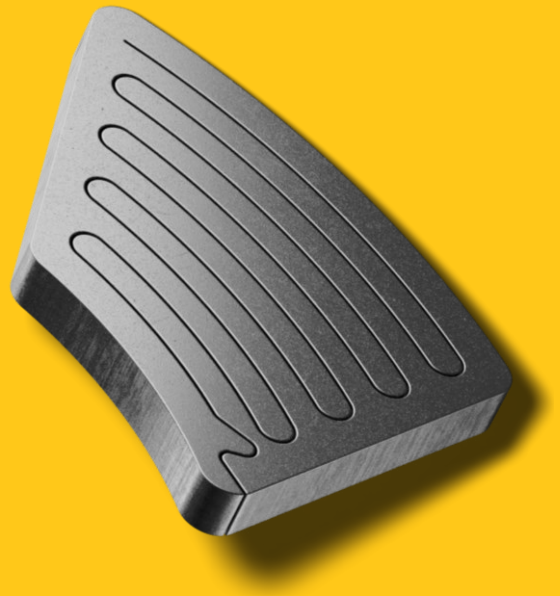
Snakeline Magnets provide lower costs

Bomatec will find an adapted solution to your challenge!

Project Saw Motor

Fischer Elektromotoren GmbH, Billigheim

By using permanent magnets with Bomatec's Snakeline technology, Fischer Elektromotoren has succeeded in improving its high-performance saw motors. In reducing the losses in the permanent magnet, it was possible to achieve a more stable temperature development even in the event of an overload.



FISCHER Elektromotoren

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Thank you for your attention!

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