

MINERAL MOLDS FOR TEXTILE EQUIPMENT

Project Head: Dipl.-Ing. Klaus Butter

Duration: 04/02 – 04/04

Initial Situation and Research Goal

In the completion of this project, evidence concerning mineral mold implementation in textile mechanical engineering was to be assessed in regard to vibration reduction.

Evidence of the ability of mineral molds to bring about a reduction in vibration, particularly in the case of a raschel knitter from KARL MAYER Textilmaschinenfabrik GmbH was to be tested. This knitter is employed in classic constructions involving grey cast iron and steel by builders of frame components.

Research Results

The vibrations of the take-off rollers were capable of improvement through the implementation of mineral molds. During the time of the project, our goals were expanded by our industrial partner. This entailed that the resulting sag from individual weight was also to be reduced. The till then sand filled trolleys sagged too intensely. The reworked mineral molding technologies (with patent protection) reduced the sag with the help of aimed dimensioning (FEM).

The raschel knitter was reworked by the producer during the duration of the research project. In this process, in the place of the till then available grey cast iron wall constructions the more affordable welded steel constructions were to be implemented. It was proven with FEM that the steel variants led to increased machine vibrations. This was a perfect opportunity to test the mineral mold filling on the steel walls as a prototype. The vibration measurements on the equipment fit with mineral mold walls demonstrate improvement in the general movement between the bracket and crankcase in comparison to the machines without mineral mold filling, more generally; they demonstrate improvement between the implements in their cohesive function.

In the horizontal direction, improvements in the area of resonance of around 40 % to 50% resulted; the improvement was more minimal in the vertical direction.

Improvement of Technical Parameters:

- Decrease of vibration as a result of mineral mold implementation
- Decrease of the statistic sagging of the take-off rollers
- Avoidance of imperfections and needle breakage
- Higher equipment performance
- Larger variation of the working width of the equipment (larger than 213 inches)

Conclusion

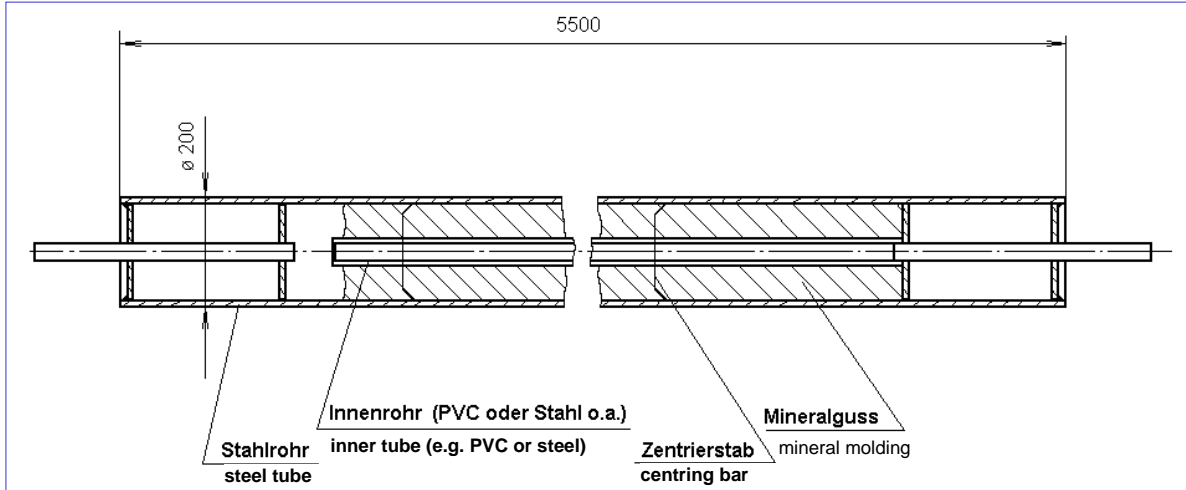
Mineral molds proved their ability to suppress vibrations when implemented in the raschel knitter. The further optimization of mineral mold layouts is both in demand and achievable.

Application and Economic Implications

The improved technical parameters induce a higher quality of textile equipment and resultantly strengthen the competitive ability of the producer so that a higher standard can be expected from the equipment. Industrial success has been continually demonstrated by the research group (Cetex gGmbH) as well as for the firm KARL MAYER Textilmaschinenfabrik GmbH and EPUCRET Polymertechnik GmbH & Co. KG. The industrial location, Germany, but particularly the state of Saxony is being strengthened.

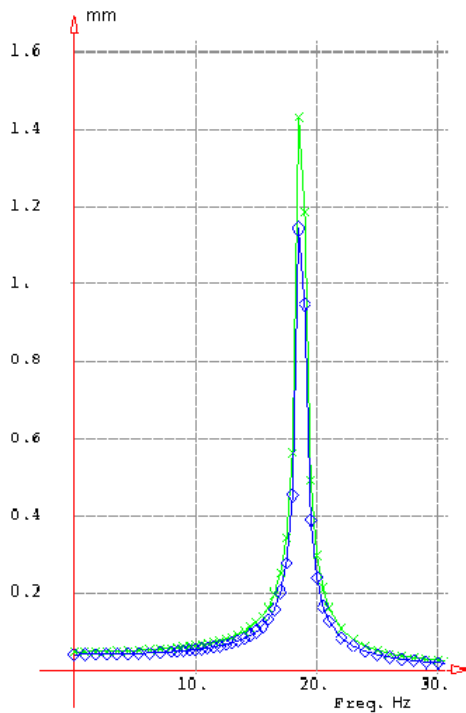
MINERAL MOLDING FOR TEXTILE EQUIPMENT

Take-Off Rollers

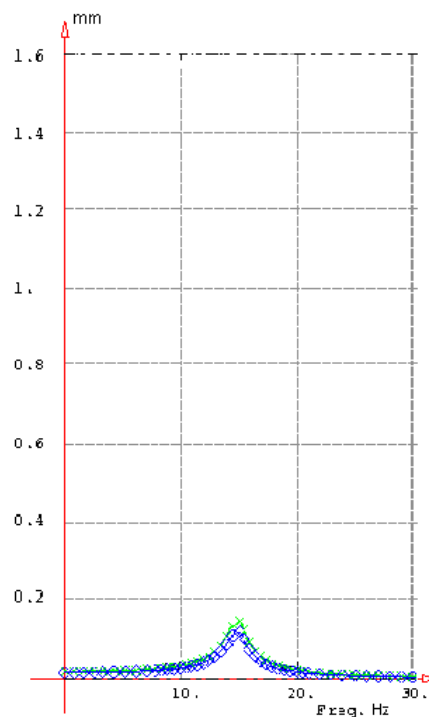


Mass, stiffness and increase in absorption is influenced by:

- Length and position of the filling
- diameter off the inner tube



ohne Befüllung
without filling

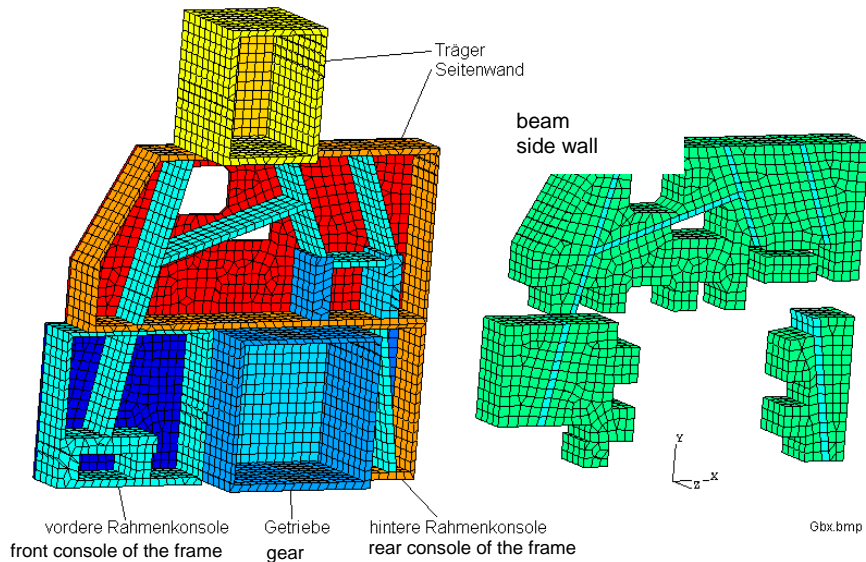


mit Mineralguss
with mineral molding

FEM calculation and vibration amplitudes in the middle of the rollers (green), and in 1.5 m edge distance (blue)

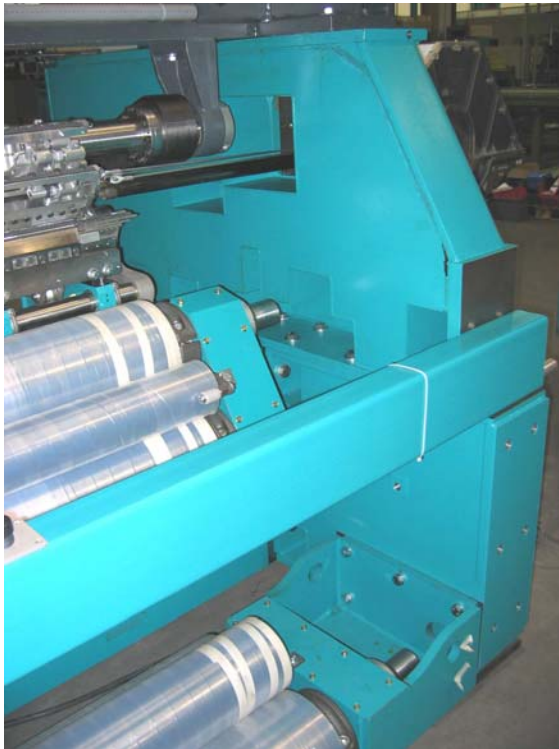
MINERAL MOLDS FOR TEXTILE EQUIPMENT

Construction of the left wall for mineral molds – only a few ribs are needed for the bond



only boxes with ribs and part of beam and gear

only mineral molding and ribs



right frame wall with welded heavily ribbed steel wall parts



right frame wall with mineral molding