INTRODUCTION AND MOTIVATION

SKZ together with Langmatz GmbH has developed a new wood polymer composites (WPC) material which is suitable for the production of complex, foamed manholes by injection molding process and consists to a significant part of renewable raw materials.

Especially in the area of infrastructure, few applications are known although the use of WPC due to many positive effects would be more than desirable in this area with its need for high-quality products.

A manhole is a subterranean junction point of cable ducts which can be fitted with various extensions (e.g. glass fibre network distributors, technology for emergency telephones or complete underfloor distribution systems). Depending on the requirements, the manholes can be assembled modularly. Usually a steel frame carries a cover which can consist of different materials (plastic, cast iron, concrete, etc.). Despite the demanding range of application in the ground, a lifetime of at least 25 years with a high resistance against occurring forces has to be guaranteed. Plastic cable manholes have been established in many areas over the years mainly due to a very modular structure, low transport weight and easy installation.

ACKNOWLEDGEMENT

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RESULTS

The material developed contains a wood fibre content of 45 wt% – a significant value in terms of injection molding – and has some technical, economical and environmental benefits compared to the current standard material (glass-reinforced PC blend). The densities of the developed WPC formulations are approx. 1.0 g/cm³ and thus below the reference sample made of PC blend.

The mechanical characteristic values that are crucial for the planned application (deflection, flexural strength and flexural modulus) are comparable with the standard material or even surpass it. The first series production parts were subjected to an assembly and installation test. A sample manhole from WPC was installed in the ground of Langmatz for an endurance test. Despite the supply and transport traffic right next to (critical load) and above the manhole, no changes were detected on the shaft structure so far.

Further advantages of the newly developed WPC material are:
- Low water absorption (about 3 % after 28 days of storage)
- Resistance to wood-destroying fungi
- Reduction of processing temperature by 100 °C
- Reduction of cycle time by approx. 8 %
- Decrease of environmental impact potential by more than 60 %

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