

The question of the fasteners and environment relation seems to be irrelevant on the face of it. The eliminated steel parts in the form of scrap are easily melted down in smelting furnaces and the new parts are produced by common technological processes.



Fig. 1



Fig. 2

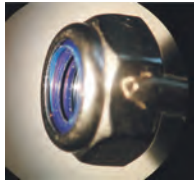


Fig. 3

A different situation happens in case of the incompatible combination of materials – steel and plastic, e.g. locking nuts according to ISO 10511/DIN 985 (Fig. 1) or in the case of other metal fasteners provided in plastic or rubber (Fig. 2).

The nuts with the plastic ring according to DIN 985 are very popular among the constructors and they are mass-produced. However, they have certain disadvantages. Besides the insignificant locking effect (we have discussed it in another place) they dispose with relatively short lifetime. The deformation of the plastic ring during the assembly and disassembly or its thermal degradation (high melting point 190° - 350°C) at high revs due to friction are the reason for it (Fig. 3).

## Fasteners – Their Impact on the Environment by Jozef Dominik

These are the main reasons why their lifetime is limited and they have to be relatively often eliminated and replaced by new ones. The old ones are scrapped then and in smelting furnaces they are melted down together with the plastic ring. The plastic ring represents rather insignificant part of the nut weight (4.55%) but considering the production of the thousands tonnes of the nuts, it is not such an insignificant mass of the pollutants which do not belong to the melting process and which contribute to air pollution, e.g. 1000 pieces of DIN 985 M18 nuts = 44 kg and the part of the plastic component is ca. 2 kg. The exact statistics on the total production mass is not at disposal but only the idea of the production in hundreds of millions pieces provide the food for thought. The above-mentioned fasteners are only one example of using the accessories of non-metallic origin for the purpose of locking or sealing together with metal parts. The relevant EU directives on waste dictate how to dispose of plastic materials. The aim of the waste regulation policy should be the minimisation of their negative impacts on the environment. Fasteners are not excluded from it and therefore they cannot be privileged.

### The Package of Measures

The biggest “sinners” in the field of mechanical joining are the metal locking and sealing elements which are fitted with plastic, rubber, various kinds of glues or other chemicals. In these cases, it is not possible to remove the non-metallic part in standard ways; therefore they are disposed as a whole in smelting furnaces. Within this process sulphur, phosphorus and other pollutants penetrate the meltage, and the rest burns down and breaks into the air in gaseous state.

The current fastener market offers several ecologically appropriate solutions. We mean especially all-metal variants of locking nuts, such

as DIN 980V and other types whose efficiency is approximately at the same level as in the case of already mentioned nuts according to DIN 985. The locking nuts IstLock® (IL) (Fig. 4) also represent an interesting variant.

Besides the high locking effect, one of their main advantages is also the possibility to easily change the plastic locking ring (Fig. 5) and replace it with a new one. On the one hand the lifetime of the IL nuts is extended and on the other hand the original ring is recyclable and saves the environment. The assembly of a new locking ring gives the original characteristics to the nuts from the locking effect viewpoint.

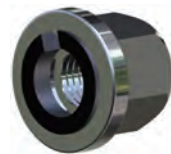


Fig. 4



Fig. 5

The IL nuts represent the important economic benefit especially in the field of the service and maintenance. During medium and general overhaul of the machines and devices, it is not necessary to change the whole nut but it is enough to furnish the old nut with a new locking ring. The costs for fasteners can be saved because the locking ring represents only a fraction of the whole nut price. This unique advantage is practically used by many customers.

### Conclusion

The given article is meant to be an attempt to evaluate the possible influences of the often used parts for mechanical joining on the environment. As it was mentioned above, not all the fasteners are ecologically acceptable. On the other hand, most of the cases are the construction elements which are used over a long period and verified in practice and therefore they can be hardly replaced by some other ones. This is not the problem of fasteners distributors, even producers but it is the question of courage and willingness of constructors to change the philosophy of the constructing. As a classic says: “Every technical drawing is a compromise of functionality, price and ecological impacts on the environment.” The given article is focused on unjustly neglected aspect of this compromise – the impact on our environment. ■