



by Jozef Dominik

# Dangerous Plagiarism Under Fasteners

Plagiarism (from- Latin *plagiare* – stealing) according to the Merriam-Webster online dictionary means: “to use another’s production without crediting the source”.

Plagiarism is most often found on campus to present as new and original an idea or product derived from an existing source. Unfortunately, it also occurs in technical practice and the production of screws is no exception. This article deals exactly with this problem.

## Scope

Screw connections are among the most difficult components because they hold together the entire construction. If one screw is bad, the others are endangered. It works like a Domino effect. Typical examples are the fastening bolts of automotive wheels. The causes of failure of the screw connection may be three:

1. Mechanical properties of steel out of the standard. Namely hardness and strength of carbon steel and alloy are very important.
2. Incorrect assembly.
3. Overloading of vehicles.

The norm ISO 989-1 strictly defines the required mechanical properties. Values for the most frequently used strength classes are shown in Table 1.

**Table 1**

Property class	8.8 $d \leq 16\text{mm}$	8.8 $d > 16\text{mm}$	10.9	12.9
Rm [MPa]	800	800	1000	1200
Rp 0,2 [MPa]	640	640	900	1080
Hardness [HRC]	22	23	32	39

Fasteners shall be designated in accordance with the ISO 898 – 1 and ISO 898 – 2 with manufacturer’s identification mark and with property class symbol (Table 1).

Assembly parameters of screw connections are among the most important design decisions. These parameters depend on the property class of the screws (Table 1). In diagram Fig. 1 is the “force security rubikon zone” that defines the conditions for assembly and operation. This zone must not be exceeded! Breach to observe this condition may result in destruction of the screw connection.

Vehicle overloading results in deformation of the wheel fastening bolts (Fig. 2) and subsequent gradual release of the wheel. The nature of this deformation depends on the size of the external load on the vehicle and on the strength characteristics of the bolts.

Of course, the issue is considerably larger and more complicated. These three basic factors are to give you an idea only of the possible danger of not respecting them. This applies in particular to security screws to fasten the wheels of cars. As can be seen from the next text on the market are likely to be found false screws with an incorrectly declared property class. Unfortunately, this is not an isolated case of fasteners plagiarism. Frequent objects of plagiarism are screw connections made of stainless steel. The intelligence of the plagiarists does not know the boundaries. Often, these are high-fossilized ideas that are hardly recognizable from the original. Read more.

Fig. 1

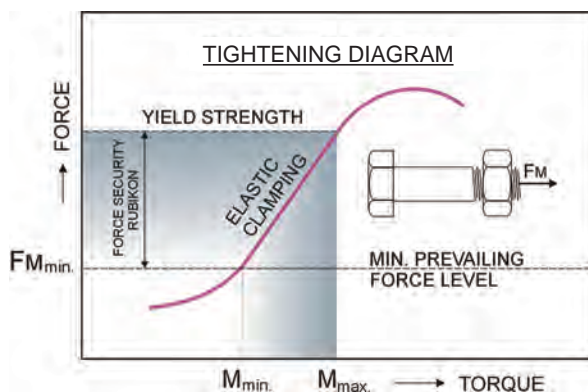


Fig. 2



Fig. 3

## Examples of Plagiarism

### Example 1:

In Fig. 3 is a bolt screw found on the road to the unknown driver from the car. A broken thread is clearly visible which would indicate excessive tightening; it means over force security zone (Fig. 1). This is sometimes the case for unprofessional assembly. However, a strong mark on the head of this screw is striking (Fig. 4 and 5). In addition, there is no manufacturer's identification mark. Immeasurable HRC hardness values have only confirmed the suspicion that it is a fake!



Fig. 4

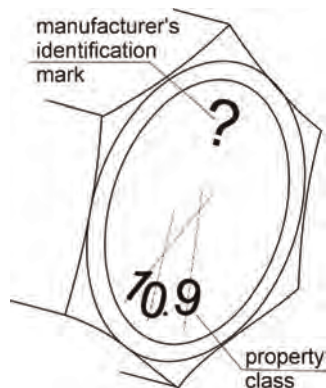
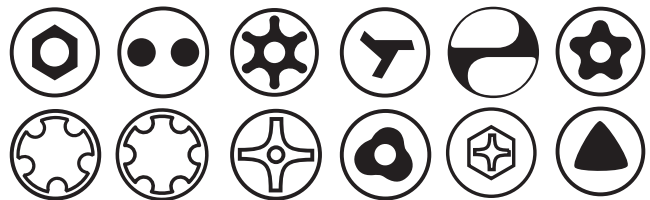


Fig. 5

# Security Fasteners



## Tamper Resistant Fasteners



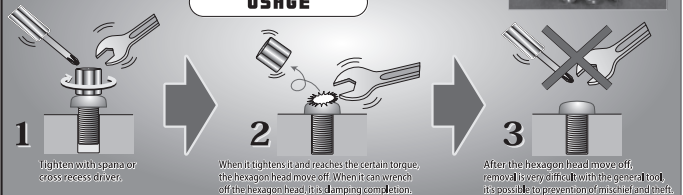
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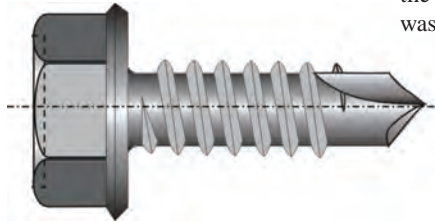
**Example 2:**

The case in Fig. 6 does not need a comment. The pressed stainless steel thin sheet on the self-drilling screw head impresses with stainless steel screws (Fig. 7). The difference is almost imperceptible to the naked eye. The user will recognize it after a certain period of operation when the first signs of corrosion appear. For reasons of objectivity, it must be added that such a construction may be acceptable. However, it must be officially declared.

Fig. 6



Fig. 7

**Example 3:**

The screw in Fig. 8 represents a typical example of the mounting of the cover holder on the kitchen utensil. On a new stainless pot, the galvanized screw could not be distinguished from the stainless steel washer. After a while corrosion of the screw was noticed. To complain it was too late.

Fig. 8

**Edification**

Counterfeits between screw connections present a significant security risk. As can be seen from the text in the case of the fastening bolts of the car wheels, there is a latent risk of wheel loosening behind the ride, endangering the lives of the crew of the car, and also pedestrians around. The worst is that such cases are more anonymous because it is difficult to identify the culprit or to exclude defective products from the market. Nevertheless, the user is not against it as defenseless. There are some symptoms that make falsification possible to be detected. These are the following:

1. Missing a manufacturer identification mark.
2. Primitively manufactured property class using a simple hand tool.
3. Stainless steel martensitic and austenitic type screws can be distinguished by a magnet. Austenite (steel A-2) is a non-magnetic structural component\*, martensite is magnetic.
4. A strikingly low price.

\* *Austenitic stainless steel screws (steel Cr - Ni) after cold forming may have some residual magnetism.*

**Conclusion**

Plagiarism is a dangerous social phenomenon, which has also hit the field of technology, and screw connections are no exception. They are fighting artists, writers, authors of professional publications and, as seen, fasteners are threatened by this problem, too. Against this, there is only one reliable option: to buy only from verified and certified suppliers or manufacturers! ■

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No.21, Min-zu Rd., Lujhu Dist.,  
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Tel: 886-7-697-2188  
Fax: 886-7-697-2180  
E-mail: sales@w-i.com.tw