

Fastener Topics - Still An Actual Subject

Despite the fact that there are countless theoretical publications on screws and threaded connections, this topic is constantly relevant. The reason is simple.

Screws are among the oldest structural elements and they have not lost their importance neither during the industrial revolution nor in the current era, characterized by a high degree of automation and electronic data processing.

Bolts are the most widely used machine components. A failure of the bolted joint could cause breakdown of machines and equipment with unpredictable consequences. Therefore, proper design, dimensioning and assembly of bolted joints is extremely important.

With a little imagination, it is easy to imagine that the screw connections (*Fig. 1*) are the symbols derived from philosophy Yin & Yang and are considered the fundamental principles of the universe and all things in it. Yin & Yang fit together organically.

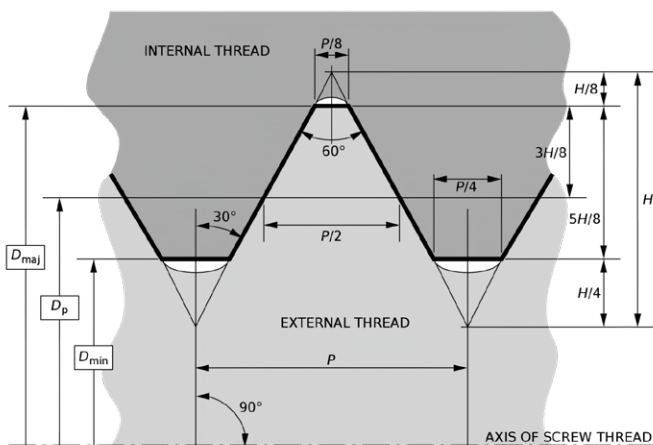


Fig. 1

However, the analogy with the philosophical principle of Yin & Yang is not the only argument that separates threaded joints from the captivity of technocracy.

The characteristic element of screw joints - the thread/spiral is an autochthonous geometric formation and exists ab origine. So it is not a product of the human intelligence. Today there are many irrefutable arguments about this. Homo sapiens only used it to his advantage and gradually developed up to the current high theoretical level.

When we talk about screw joints, we cannot forget another important factor independent of humans, and that is friction (Fig. 2). Men can influence it by choosing the roughness of the contact surfaces, but cannot completely eliminate it, because it exists outside of their will. If it weren't for friction, any structure would disintegrate into its individual components. Here it is necessary to remind the so-called thread joints paradox, according to which friction is undesirable during

assembly, but on the other hand, after final assembly, it is necessary that the joint does not fall apart. Securing bolted joints against loss of assembly force during operation has become one of the most important decisions of the designer.

The beginning of the industrial revolution also caused an unprecedented development of screw connections. The first industrially made screws were made of wood (*Fig. 3*). At present, it is steel with a strength of 800 - 1400N/mm², stainless steel with high corrosion resistance and at the same time high mechanical properties (martensite stainless steel), brass, Cu and aluminum. Ti alloys are used for special purposes.

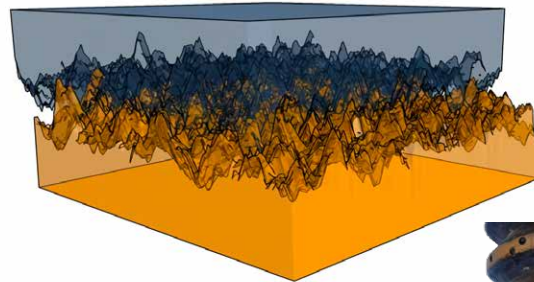


Fig. 2. Friction demonstration

Fig. 3. Screw made of wood



At the same time, the development of new, highly sophisticated polyfunctional fasteners types (*Fig. 4*) and the improvement of their assembly procedures took place.

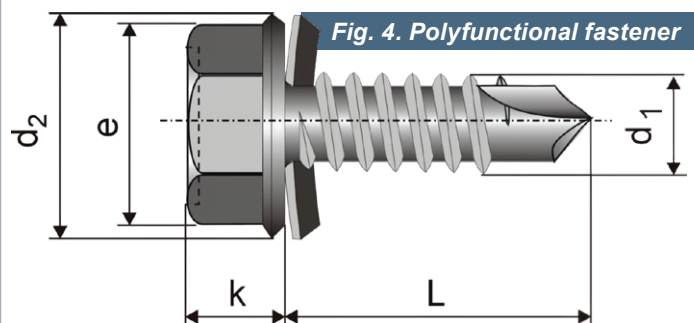


Fig. 4. Polyfunctional fastener

Conclusion

A well-known metaphor forces itself into attention: "Dogs bark, the caravan moves on". It also applies to screw connections. For years, research institutes and designers have been trying in vain to replace threaded connections with fasteners that are more convenient for assembly. The screws steadfastly maintain their position and stay that way. ■

