

THREADS BARED

GENERAL

There are so many types and varieties of screw-threads that even the so-called initiated can become confused without the appropriate measuring equipment and reference charts.

In this article however, I propose to deal with and perhaps clear up some misconceptions about the three main types of screw-thread commonly used in this country - namely, the common British American and metric threads.

To introduce this topic, we have to go back a bit in history, in fact to about the middle of the 19th century for the introduction of standards. Screw-threads however, go back much further than this, in fact to the Roman Empire. At this time, it was discovered that the form of a screw could be created by impressing a suitable shape into sand and then filling the impression with molten metal (casting). If the form was a wooden cylinder with a raised spiral around it, then the resulting casting was in the shape of a crude metal screw. This technique worked for external threads (male), but could not be employed to make internal (female) treads in nuts. Consequently, the technique was to cast a "collar" with a central hole slightly smaller in diameter than the crude bolt. The collar was split on one side, wedged open slightly, and passed over the crude "thread". A sand and water "cutting medium" was applied and the developing "nut" (the collar) was slowly rotated around the male thread, the wedge being slowly moved out as an internal thread was formed by abrasion inside the nut. Eventually, the nut or collar could wind more or less "smoothly" along the screw. Now you know why the Romans used slave labour! Obviously, no two threads were the same, so that interchangeability was a luxury yet to come.

This lack of interchangeability continued up until the middle of the 19th century when just about every man and his dog was building machine tools. Each of these manufacturers produced screw-threads to his own ideas (though not quite by the same methods as the ancient Romans - some things had advanced!). Each also had his own ideas about the size of bolt heads and nuts. There was no interchangeability of bolts, nuts or spanners.

BRITISH THREADS

The situation became so intolerable that a gentleman named Whitworth was given the task of producing a standard sizing for these components. This is what he came up with.

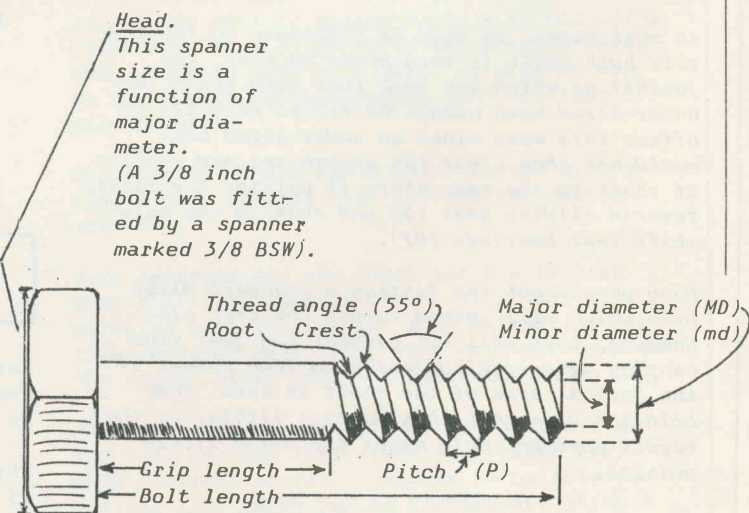
The "Whitworth Thread", as it was called, was adopted throughout British industry, and was quite satisfactory up until the turn of the century. By then, the motorcar was being developed. Coarse threads have one major disadvantage - they tend to loosen with vibration, and of course early motorcars were not lacking in this respect, either from mechanical sources or from the less than perfect road surfaces of the day. Consequently, bits fell off with monotonous regularity!

This tendency to shed components led to the development of a finer thread. This was to be the BSF (British Standard Fine) which was based on the whitworth thread form but having a finer pitch and thus a greater T.P.I. (TPI). The head too was a little smaller, but still based on a function of the major diameter. However it was down one size relative to whitworth, which is why a British bolt with a 3/8 inch major diameter is fitted by a spanner marked 5/16 BSW (British Standard Whitworth). Hang on a minute, you say. Both 3/8 BSW and 3/8 BSF bolts nowadays take a 5/16 BSW spanner. Yes, they do!

It was decided during the 1914-1918 war that the original BSW was a little larger than necessary, and as an austerity measure, BSW heads and nuts were reduced to the same size as BSF i.e. the "austerity size" which has remained to this day (a little less material, a little cheaper to produce).

(To be continued).

Jack Weaver.



Pitch: The distance from a point on one thread to an identical point on the next thread e.g. crest-to-crest.

Threads per inch: All thread forms except metric are expressed in this unit (TPI, T.P.I.).

Set screw: A bolt with thread right up to the head.

Stud: A threaded shaft without a head.

Shoulder bolt: Bolt with diameter of grip length greater than MD.