Checking torque values

WORKSHOP HINTS AND TIPS

By GEOMETER

EMPLOYIN G only a very elementary rig which can be made up in a few minutes, some weights or spring balances, many of the simpler problems involving torque, can be solved.

By using ordinary spanners, one can get an idea of what particular torque values involve in effort-or one can verify the setting of a torque wrench. Simple torque-testing devices can be set or checked for use, as when pre-loading bearings--and it is also possible, if one is compiling simple design data or checking the twisting-qff values of small bolts or screws, to do so with the minimum of trouble.

The basic rig is as at ***A,*** consisting of a rectangular bar drilled at the centre, so as to balance reasonably, and fitted with a stud or bolt locked with two nuts, and the stud or bolt mounted in a bent-up and drilled bracket which can be held in the vice. The bar can pivot freely in the bracket, and at one end suitable weights or a spring balance can be applied.

The length X from the pivot to where the weight or spring balance is attached can vary according to the work undertaken. For a test of torque of a few lb. in, as required when pre-loading bearmgs, length X would be some small dimension in inches.

For example, if the pre-load is 4 lb. in., length X could be 4 in.,. and a 1 lb. weight attached. It would then take a torque of 4 lb. in. on the nut to lift the weight with the bar, or to pull the spring balance to read 1 lb. For higher or lower torques at the same length, weights are merely increased or reduced. If the weight is made 1-1/2lb., then 4 x 1-1/2=61b.in.; while if the weight is reduced to 3/4 lb., then 4 **x 3/4 =** 3 lb. in.

For much bigger torque values, involving lb. ft., length X should not, be less than 1 ft, and may well be 2 ft. With length X as 1 ft, a weight of 10 lb. will give a torque of 10 lb. ft; while if length X is 2 ft, the weight of 10 lb. will give a torque of 20 lb. ft. Thus, length X and the weight, multiplied together, always give the torque in lb. in. or lb. ft, as the case may be.

Checking of pre-load on a shaft to a few lb. in. can be done with a device as at ***B,*** using a spanner on the nut at the end of the shaft, or pushing the mounting rod through the hole in the shaft, there being collars with grubscrews for length X to be adjusted as necessary.

The " measuring head " of the tool. is a plunger or rod with a spring and a bent-over strip serving as a pointer. The plunger slides in a boss soldered to the mounting rod, carrying a scale or some reference marks on the outside.

To set the tool for torque-the pointer pushing to a certain position on the scale, preferably about the middle-the rig at ***A*** is prepared, and the tool and box spanner applied (when the nut is the right size)? and the free end of the. spanner lightly supported.

A push on the plunger lifts the weight and gives the torque on the scale. If the spring is weak a stronger one can be fitted, or the mounting rod lengthened; if the spring is strong, the rod can be shortened.

When the box spanner cannot be applied, a simple U-bracket can be fitted to the arm on the rig, and the mounting rod set through that, as at C. A modified measuring head, as shown, can be fitted with mounting rods of different lengths, and a clamp for use on nuts and shafts.

Using a stirrup on the bar of the rig, as at ***D,*** small bolts can be fitted to test the twisting-off values, wedging the head Y with a spanner, and applying torque to the nut Z.