A method of strengthening and repairing damaged threads. Firstly, remove metal buildup from the damaged threads. Secondly, peen the damaged threads using glass beads. The glass beads are not less than .02 of an inch and not more than .03 of an inch in...
diameter. They are projected substantially at right angles to the damaged threads at pressures of not less than 80 and not more than 110 pounds per square inch. This method is particularly suited for repairing threads that still gauge properly.
The present invention relates to a method of strengthening and repairing damaged threads.

5 BACKGROUND OF THE INVENTION

In the absence of adequate lubrication, a metal on metal connection of mating threads is subject to galling and impact damage. When this occurs, metal build up makes the threads unusable. The threads are returned to a machine shop to be repaired by remachining.

Repair by remachining has a number of drawbacks. Firstly, it is an expensive and time consuming procedure. Secondly, remachining can only be performed a limited number of times; for each time remachining occurs material is removed.

When the damage to the threads is not too severe, the threads still gauge properly. In such cases it is a waste of resources to subject the threads to remachining.

SUMMARY OF THE INVENTION

What is required is a alternate method of strengthening and repairing damaged threads, when the damaged threads still gauge properly.

According to the present invention there is provided a method of strengthening and repairing damaged threads. Firstly, remove metal buildup from the damaged threads. Secondly, peen the damaged threads using glass beads. The glass beads are not less than .02 of an inch and not more than .03 of an inch in diameter. They are projected substantially at right angles to the damaged threads at pressures of not less than 80 and not more than 110 pounds per square inch.

It is known that peening will improve the fatigue
strength of materials, this is taught in United States Patent 3,073,022. It is also known that peening has the effect of mending microcracks, this is taught in United States Patent 5,205,145. These teachings cannot be directly applied to threads as most forms of shot used in peening are harmful to the threads. In other applications, any type of shot within the size range described and propelled within the pressure ranges described could accomplish a beneficial result. The problem is that as shot is reused it becomes deformed and undersize. If shot is undersize then pressures within the beneficial pressure range can propel the shot at speeds sufficient to cause damage. It is, therefore, preferred that glass beads be used as the type of shot. Glass beads tend to destroy themselves upon impact before damage to the threads occurs. The glass beads travelling at too high a rate of speed explode upon impact and turn to dust without harming the threads. If the glass beads used are smaller than the size range described or are propelled at pressures less than the range described, they will not repair the microcracks in the damaged areas of the threads. If the glass beads are larger than the size range described or are propelled at pressures exceeding the range described, they will further damage the damaged threads.

Using the method, as described above, the threads are repaired and at the same time are strengthened. The glass beads pits the surface of the threads with a plurality of substantially uniform microscopic indentations. This pitting enables the threads to retain lubricant and makes it less likely that galling will occur in future.

**BRIEF DESCRIPTION OF THE DRAWINGS**

These and other features of the invention will become more apparent from the following description in which reference is made to the appended drawings, wherein:
FIGURE 1 is a side elevation view illustrating the first step of the preferred method.

FIGURE 2 is a side elevation view illustrating the second step of the preferred method with one nozzle angle.

FIGURE 3 is a side elevation view illustrating the second step of the preferred method with an alternate nozzle angle.

FIGURE 4 is a side elevation view of threads repaired in accordance with the teachings of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The preferred method of strengthening and repairing damaged threads will now be described with reference to FIGURES 1 through 4.

Referring to FIGURE 1, there is illustrated a damaged thread 10 that has some metal buildup 12. The first step is to remove metal buildup 12 from damaged threads 10. In FIGURE 1, it is illustrated that this step is performed using an abrasive wire wheel 14, but this can be done using a file (not shown) or other instrument suited for the purpose. Care is taken to limit the removal of metal. The excessive removal of metal can affect the gauging of threads 10. Referring to FIGURE 2, the second step involves peening damaged threads 10 using glass beads 16. In the peening process glass beads 16 are propelled out of nozzle 15. The operative angle can be between 45 and 110 degrees. Referring to FIGURE 3, it is preferred that the angle used by approximately 90 degrees. In order to ensure a successful result, it is preferred that glass beads 16 are not less than .02 of an inch and not more than .03 of an inch in diameter. The pressures used to project glass beams 16 should be not less than 80 and not more than 110 pounds per square inch.

Referring to FIGURE 3, when glass beads 16 within the size range described and are propelled within the pressure
ranges described at threads 10, they tend to explode and turn into smaller particles 18 or dust without harming threads 10. If the glass beads used are smaller than the size range described or are propelled at pressures less than the range described, they will not repair the microcracks in the damaged areas of the threads. If the glass beads are larger than the size range described or are propelled at pressures exceeding the range described, they will further damage the damaged threads. Using the method, as described above, the threads are repaired and at the same time are strengthened, as illustrated in FIGURE 4. The surface area of the threads is pitted by a plurality of substantially uniform microscopic indentations. This pitting enables the threads to retain lubricant and makes it less likely that galling will occur in future.

It should be noted that in some instances the metal buildup is so minor it may be removed through peening. It should also be noted that the peening alone, as described, has a beneficial effect, and can be used as a preventative measure on new and unused threads.

It will be apparent to one skilled in the art that modifications may be made to the illustrated embodiment without departing from the spirit and scope of the invention as defined by the Claims.
THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE AS FOLLOWS:

1. A method of strengthening and repairing damaged threads, comprising the steps of:
   firstly, removing metal build up from the damaged threads; and
   secondly, peening the damaged threads using shot that will be destroyed prior to damaging the threads, the shot being not less than .02 of an inch and not more than .03 of an inch in diameter, and being projected substantially at between 45 and 110 degrees to the damaged threads at pressures of not less than 80 and not more than 110 pounds per square inch.

2. The method of strengthening and repairing damaged threads as defined in Claim 1, wherein the shot is a glass bead.

3. The method of strengthening and repairing damaged threads as defined in Claim 1, wherein the angle of projection is at substantially 90 degrees.
Figure 4