

Knowledge domain: Mechanical
Unit: Attachment
Skill: Loosening Frozen Nuts

Tools and Parts Required

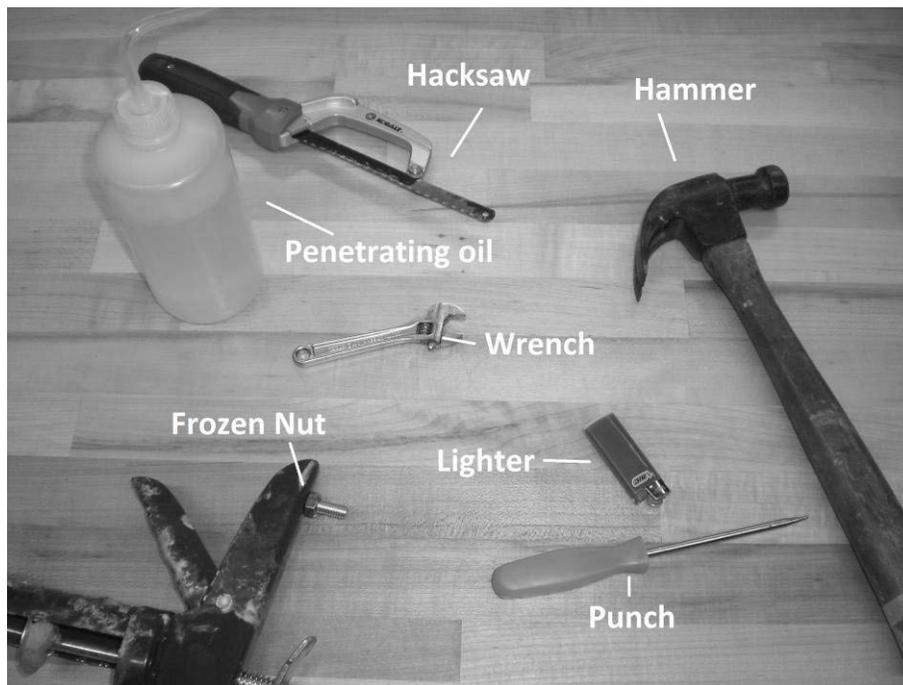
- 1) Frozen nut and bolt
- 2) Wrench
- 3) Hammer
- 4) Center Punch
- 5) Heat source (a hair dryer, a lighter or matches)
- 6) Penetrating oil (like WD40)
- 7) Wire brush
- 8) Safety goggles
- 9) Work gloves

Introduction

Eventually, nuts will become stuck due to corrosion, rust or mineral buildup. A nut that does not turn even when you use a wrench is called a frozen nut. When you disassemble equipment, you may find a frozen nut. Frozen nuts can prevent you from repairing a medical device. These nuts need to be safely removed.

Example

Below is a picture of all the materials.



Below is a picture of a frozen nut.



Identification and Diagnosis

Rust is often on frozen nuts. Rust is brown and red. Rust is flakey. Rust is usually found where the metal is exposed to water. Mineral buildup may appear on frozen nuts.

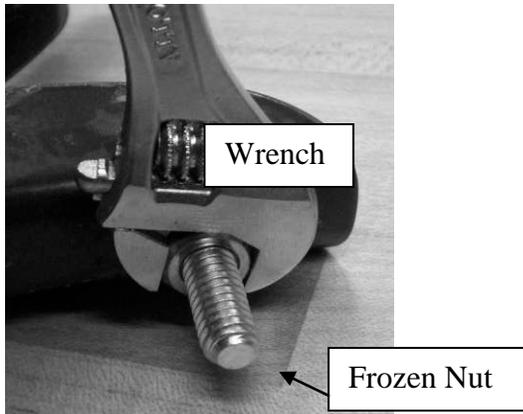
Mineral buildup is black. To identify a frozen nut, try to loosen the nut with a wrench. A frozen nut does not turn even you use a wrench.

Procedure

Failure to follow this procedure can create worse problems. If you continue to use a wrench on a frozen nut, you will damage the corners of a nut. The pointed corners of the nut will become smooth and rounded. The nut will become difficult to turn. If you use a hammer with excess force, you will break the bolt into pieces. Be cautious not to smash your fingers. There are several methods to loosen frozen nuts. To choose the appropriate method, perform the procedure below. Stop when the nut is loosened.

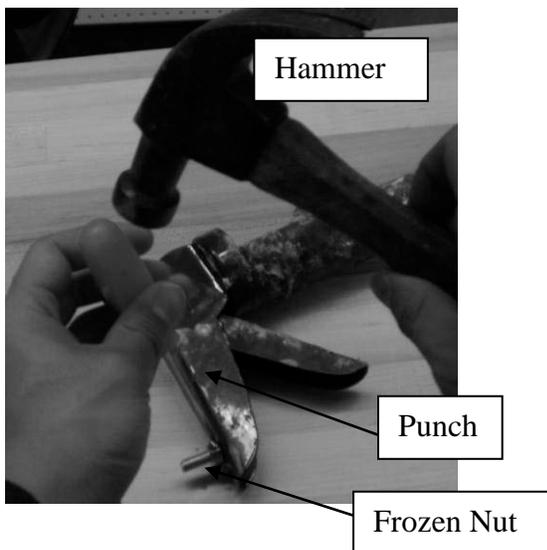
Before you start, examine the bolt and nut. If the bolt or nut is covered with bits of rust, use a wire brush to scrub the bits of rust off. Wipe the area dry. If the nut is encrusted with mineral buildup (such as whitish lime deposits), use a wire brush to remove the mineral buildup. If you cannot remove mineral buildup with a wire brush, apply white vinegar to dissolve any remaining mineral buildup.

1. Tighten the Nut. First, try to tighten the nut. Turning the nut in either direction loosens the nut. Next, loosen the nut with an appropriately sized wrench. If the nut is still frozen, continue to the next step.



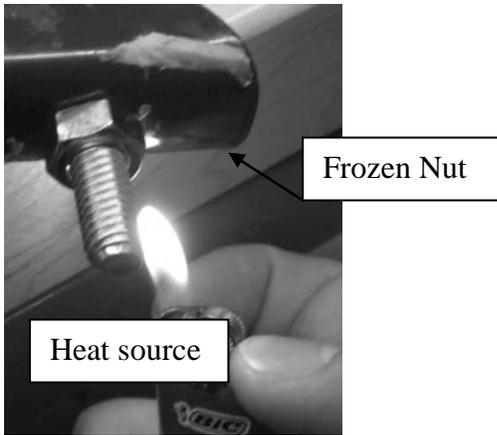
*Warning: Using a hammer on a nut on a ceramic object, like a toilet bowl, can break or damage the object. Consider the surrounding material. *

2. Hammer and Center Punch. Place a center punch on the nut and strike the punch with a hammer. Ensure you hit the nut only. Do not hit the surrounding threads. DO NOT hit the bolt with a hammer. This could tear the threads on the bolt. Try to loosen the nut with a wrench. If the nut is still frozen, continue to the next step.



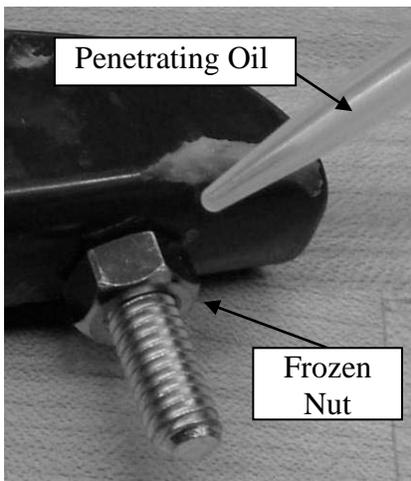
Warning: Heat can harm a variety of materials. Only continue this step if you can safely heat the nut without damaging the nearby area. If the surrounding material is flammable, do not continue to this step.

3. Apply Heat. Apply heat to the nut if the nut is still frozen. When you apply heat to metal, metal expands, which may loosen the nut. Use a hair dryer, lighter, matches, or propane torch. Use a flame-resistant fabric to shield any nearby flammable objects or materials. Try to turn the nut with a wrench before the nut cools. If the nut is still frozen, continue to the next step.

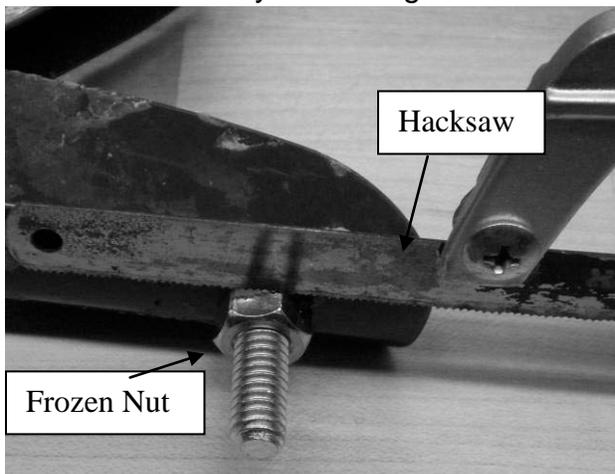


Warning: Penetrating oil is flammable. Do not continue to this step until the nut and bolt are cool.

4. Penetrating Oil. Apply penetrating oil to the threads near the frozen nut. Wait to allow the frozen nut to soak in the penetrating oil. Waiting longer helps loosen the nut. At minimum, wait ten minutes. It is best to wait one hour. Try to turn the nut with a wrench. If the nut is still frozen, move on to the next step.



5. Hacksaw. If a nut is still frozen, use a hacksaw to remove the nut. Cut through the threaded stem on the nut. Only cut through the nut. Do not cut the bolt. Break the nut loose.



Exercise

Your instructor will give you an object with a frozen nut. The object may be a piece of medical equipment from your hospital. Use the procedure above to loosen the nut. Your instructor must verify your work before you continue.

Preventative Maintenance and Calibration

Frozen nuts can be prevented with regular maintenance. Cover nuts on equipment that is not exposed to patients or staff with oil or grease to prevent the nuts from freezing. Rust on nuts can be prevented. Keep the nut and bolt dry. When you repair a medical device, loosen and retighten the nuts to keep them from freezing. Retighten the nuts completely before returning the device to use. Always calibrate every medical device before returning it to use.