



Nuclear Gauges Used in Road Construction

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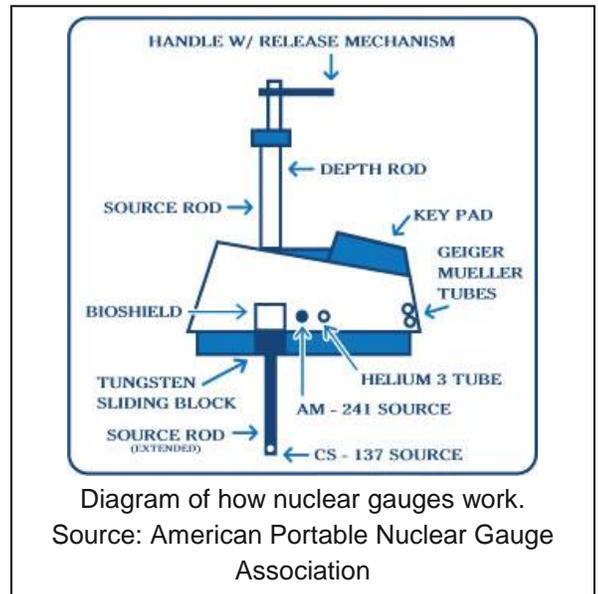
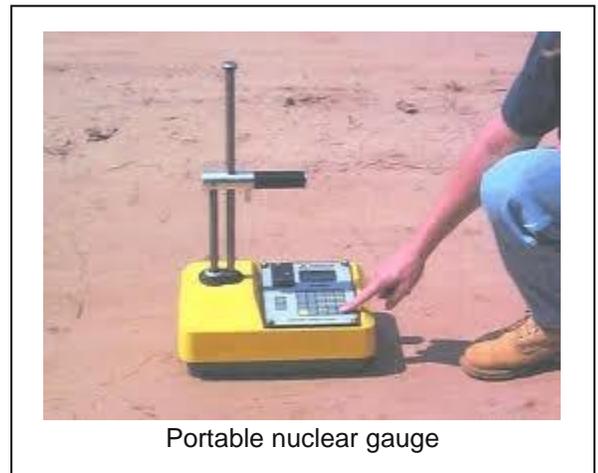
- When properly used, nuclear gauges will not expose the public to radiation.
- Nuclear gauges must be used safely and disposed of properly.

About Nuclear Gauges Used in Road Construction

Building a road isn't easy; there are many layers that help make it strong enough to support big trucks and cars. Each layer must have the right density and layers of gravel must have the right amount of moisture. Construction crews measure density and moisture with special nuclear gauges that are powered with sealed radioactive sources. Nuclear gauges use radioactive sources to measure the thickness, density or make-up of a wide variety of material or surfaces. There are two types of nuclear gauges, fixed and portable.

Fixed gauges can be used in industry to make sure each item is the same. For example, paper mills use fixed gauges to measure the thickness of a sheet of paper and some bottlers use them to make sure that each bottle contains the right amount of liquid. Typically, a fixed gauge houses a radioactive source that is covered by a shield. When the shield is opened, an invisible beam of radiation is shone on the object. A readout on the gauge or a connected computer terminal shows the requested information, often the thickness or level of liquid in a container as it is being filled.

Portable gauges are commonly used in industries such as agriculture, construction and civil engineering. They often measure soil moisture or other items such as the density of asphalt in a paving mix. Portable gauges work by using direct transmission or backscatter. Direct transmission is the more precise of the two, it measures how much radiation passes through an object. The denser the material, the less radiation passes through. Portable gauges that use backscatter are most useful for measuring uniform material such as asphalt paving. Backscatter gauges measure how much radiation bounces back to the gauge after it hits the surface of an object. The denser the material, the more radiation will bounce back.



Nuclear gauges are designed with worker safety in mind. They are lined with a lead shielding around the sealed source, which blocks the radiation. Workers usually receive little or no radiation from nuclear gauges. When properly used, nuclear gauges will not expose the public to radiation.

When no longer in use, nuclear gauges must be disposed of properly. They are hazardous waste and should not be treated as ordinary trash. Gauge manufacturers or state radiation control program staff can provide disposal instructions. Some manufacturers also accept gauges for disposal.

Rules and Guidance

U.S. DEPARTMENT OF LABOR (DOL), OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

OSHA sets regulations and standards for the safety of workers. Their regulations cover a wide range of work places, including construction and demolition sites. OSHA regulations cover the safe handling of radioactive material or radiation-generating equipment such as nuclear gauges.

U.S. NUCLEAR REGULATORY COMMISSION (NRC)

NRC issues licenses to companies to use nuclear gauges. The companies must follow specific safety measures for the use, storage and disposal of nuclear gauges. NRC sets strict safety standards for uses of nuclear equipment including nuclear gauges. It is the responsibility of the person owning the license to follow federal and/or state safety rules. They also must ensure that working with or around nuclear gauges will pose no radiation hazard to workers and no threat to public health, welfare and the environment.

THE STATES

Many states have signed formal agreements with the NRC giving them the authority to regulate radioactive materials. These states are known as NRC Agreement States. Each state has an office that is responsible for regulating/monitoring radioactive materials used or possessed within their borders. They are also responsible for protecting public health, welfare and the environment from uncontrolled releases of radiation. They also must respond to and investigate incidents (theft, loss, etc.) involving gauges with sealed radioactive sources.

What you can do

It is highly unlikely that you will encounter a nuclear gauge. However, if you find a nuclear gauge, it is important that you do not handle it. Call local authorities immediately and report it.

Remember: Radiation from a fixed nuclear gauge does not make the items it passes through radioactive.

Where to learn more

You can learn more about nuclear gauges by visiting the resources available on the following webpage: <http://www3.epa.gov/radtown/gauges-road-construction.html#learn-more>.