AMMONIUM NITRATE FERTILIZER CAN EXPLODE

O.W. Moore, Road Construction Foreman,
Edward Blaser, Safety Officer[1]

Introductory note:

Until this year, we have not been too concerned with safety factors in the use of ammonium nitrate as a fertilizer. Then a devastating explosion involving the chemical occurred in Roseburg, Oregon.

The following discussion of the hazard attendant upon the storage of quantities of this commonly used fertilizer is based on information furnished by O.W. Moore of Region 2, Ed Blaser of Region 6, and the Manufacturing Chemists' Association, Inc.

Our recommendation is that if you make extensive use of this fertilizer, as in a tree nursery, then take every precaution in handling the material. You should check with the manufacturer for additional standards. If you make only a limited use of it, as for a few seedbeds or a lawn, you should buy only enough to use for the current need.

Jack Heintzelman
Safety and Employee Relations
Chief's Office, U.S. Forest Service

1. Handle ammonium nitrate much as you would handle material such as gasoline. Under all normal circumstances and with due care, the material is safe to handle.

2. Under conditions of extreme heat confinement (several hundred degrees F.) or open flame, ammonium nitrate can be dangerous.

   Prohibit smoking in storage areas.

3. Ammonium nitrate is not particularly flammable, but burns intensely when set on fire. Clean up dust from broken bags immediately; this dust is flammable.

   a. Bags of ammonium nitrate should be set on wooden pallets to insure cleanliness and protection from moisture.

   b. Do not store with explosives, organic chemicals, corrosive acids, or flammable liquids. Keep storage areas clean of iron filings, sawdust, and rags.

   c. Do not store with work tools, equipment, or clothing, or in a shop area or repair area.

   d. Empty bags should be disposed of by burning- -a few at a time.

4. Ammonium nitrate should be stored in a building with good ventilation. Store not less than 3 feet from walls, eaves, or spreader beams overhead.

5. Ammonium nitrate should never be stored in a building capable of confining gases, such as a stone or concrete building with small windows. Aluminum roofing and siding on a wood stud framework are satisfactory. To facilitate cleaning, wood studs should be on the outside of the metal siding. A natural draft vent should be provided in the roof. Floors should be of a type that can be kept clean and dry, and reasonably fire resistant. A washdown drain should be provided. Heat should be externally furnished. Wiring should comply with Article 500 of the National Electrical Code.

1 Mr. Moore is a Road Construction Foreman on the Rio Grande National Forest, Monte Vista, Colo., and Mr. Blaser is in the regional office. Portland, Oreg. Both men are with the U. S. Forest Service.

6. Ammonium nitrate must never be contaminated with unknown materials or with materials not specifically recommended by the manufacturer of the nitrate. This is extremely important as a number of rather common substances may cause unpredictable reaction conditions if mixed with ammonium nitrate. Areas where ammonium nitrate has been spilled or otherwise contaminated should be sprinkled with lime and hosed down.

7. The dangerous mass limit of ammonium nitrate is 123 tons. At this level a fire can spontaneously change to a detonation. Every stock of 40 to 50 tons should be separated by at least 6 feet of space and a light metal partition, such as a corrugated iron sheet.

8. Ammonium nitrate can produce relatively toxic oxides of nitrogen and carbon monoxide while burning. An automatic sprinkling system with an overhead storage tank for water is advised, or at least some hose with pressure great enough to reach the fire without unduly exposing the firefighters to the fumes generated by the burning nitrate. Chemical extinguishers containing carbon tetrachloride, gas, or foam are useless for this type of fire and should not be used.

9. Flooding with water is the only effective way to fight a nitrate fire as the nitrate has its own oxygen supply built in.

10. Ammonium nitrate is not hazardous if three things are kept in mind: (1) No contamination unless specifically recommended, (2) no confinement or excessive heat (flame), and (3) no storage near the critical mass (123 tons).

Addendum

For those who make considerable use of ammonium nitrate, an excellent comprehensive booklet "Fertilizer Grade Ammonium Nitrate", Manual Sheet A-10, can be obtained from the Manufacturing Chemists' Association, Inc., 1825 Connecticut Avenue, N.W., Washington 9. D.C.