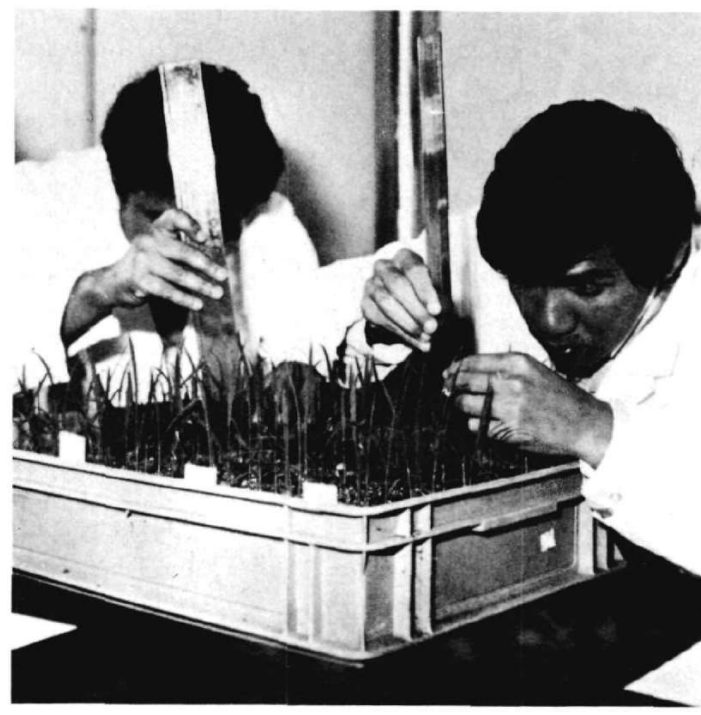


Among typical uses of commonly transported radionuclides are plant and crop research in agriculture, and quality-control inspections in aircraft and other industrial machinery. Top photo shows gamma radiography equipment being used to check engine interiors of a passenger jet. (Credit: Tech/Ops)

Perceptions, perspectives, proportions

Nearly a hundred years ago – in 1893 – when railroads still monopolized land transport, the first set of international rules governing shipments of hazardous materials were issued to cover their movement by rail.* Since then, more than a dozen international bodies, and scores of national regulatory agencies, have published regulations directed at the carriage of dangerous goods by road, sea, air, as well as rail.

The regulatory network today covers virtually all kinds of substances and commodities that are used for beneficial purposes, but that under certain conditions are potentially harmful to people and the environment. These include the chemical fertilizers farmers spread on their fields, the nuclear fuel now powering electricity plants in some two dozen countries, the drugs physicians use to diagnose and treat illnesses, and the fossil fuels, such as gasoline, routinely used in transport vehicles.

All told today, about 21 different international labels are required to identify separate classes of dangerous goods – among them, explosives, corrosives, and flammables. Another separate class – radioactive materials – is the specific subject of feature articles in this issue of the *IAEA Bulletin.*

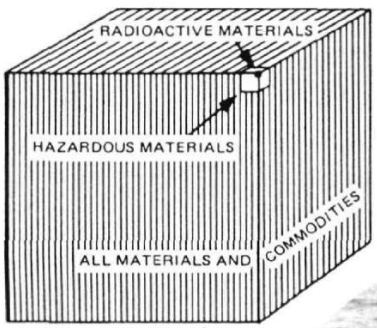
The evolving regulatory system reflects at once the growth in traffic of hazardous materials, essentially a post-World War II trend. Since the mid-1940s, for example, the transport of all dangerous goods – just on the seas – has grown 1000%, based on reports at a recent international conference.**

Overall, years ahead will see further increases. By 1990, for instance, the international carriage of chemicals is estimated to grow about 45%, and most of this movement will be over public roads.*** Radioactive

* "The Problems Encountered by International Road Transport in Multimodal Transport Operations," by M. Marmy, paper presented at the 8th International Symposium on the Transport and Handling of Dangerous Goods by Sea and Associated Modes, Havana, Cuba, 1984.

** "Packaged Dangerous Goods in Ports – Are Special Safety Procedures Necessary? ," by Karsten Brünings, paper presented at the 8th International Symposium on the Transport and Handling of Dangerous Goods by Sea and Associated Modes, Havana, Cuba, 1984.

*** See paper by M. Marmy, referenced above.



Proportionally, radioactive materials are only a small part of all goods shipped by any mode, not just by sea. The figure illustrates that in the United States, for example, hazardous materials are 1/5000 of all items shipped. Radioactive materials, in turn, are 1/50 of all hazardous materials transported. (Figure credit: *Understanding Radioactive Waste,* by R.L.Murray, Battelle Press (1982). Photo: IMO)

material shipments also will increase, as more nuclear power plants come on line, waste management and disposal activities intensify, and medical, industrial, and research uses of radioisotopes are more widely applied.

Although many people assume that radioactive materials are the *most* common type of hazardous cargo, and the most dangerous to transport, the following articles clarify that this perception is not accurate. In context, radioactive materials constitute only a fraction of all dangerous goods routinely shipped around the world. And the modern regulatory structure – coupled with safety tests, careful shipping practices, and, above all, strict packaging requirements – has served to protect the public and environment throughout the past 40 years of shipping radioactive materials.

Other articles clarify that within the established regulatory framework for radioactive material transport, the Agency's role is one of an advisor, not an overseer. Though they govern the IAEA's own activities and have been widely accepted, Agency transport regulations serve only as recommendations for Member States and other international organizations to use as basis for their own rules. Updated IAEA transport regulations will be issued in 1985.

As past is prologue, the future will neither be accident- nor problem-free, the articles emphasize. Challenges remain in international commerce involving radioactive material shipments so that movements become more efficient and standards more uniform. An offspring of these efforts most certainly promises to ensure safety and bring broader public understanding, and clearer perspectives, to this important field. – *Editor*

Some radionuclides in widespread use

Radionuclides	Use/Purpose
Americium-241	Smoke detectors
(with Beryllium)	Moisture content-density gauges Oil & gas well logging
Gold-198	Research/tracer
Carbon-14	Research/tracer
Cobalt-57, 58, 60	Medical/diagnostic; industrial
Chromium-51	Medical/diagnostic
Caesium-137	Moisture content-density gauges Medical/therapeutic Oil & gas well logging Density & level gauges
Gallium-67	Medical/diagnostic
Tritium	Luminescent devices
Tritium	Research/tracer Oil & gas well/tracer studies
Iodine-125	Medical *in vitro* tests Research/tracer
Iodine-131	Medical/diagnostic Medical/therapeutic
Iridium-192	Oil & gas well logging
Krypton-85	Thickness gauges
Neodymium-147	Research/tracer
Polonium-210	Static eliminators
Scandium-46	Research/tracer
Strontium-90	Thickness gauges
Technetium	Medical/diagnostic
Thallium-201	Medical/diagnostic

Looking ahead : PATRAM '86

The IAEA, in co-operation with the Government of the United States of America, currently is organizing the 1986 International Symposium on the Packaging and Transport of Radioactive Materials (PATRAM '86), which will cover in depth a wide range of topics in the field.

As now sheduled, the meeting will be held at the invitation of the Government of Switzerland from 16 to 20 June 1986 in Davos, Switzerland.

Those wishing to attend are reminded that participation must be through designation by the Government of an Agency Member State, or by an organization invited by IAEA to participate.

Participation forms – as well as forms for submission of a paper if one is proposed for presentation – may be obtained from the IAEA or from the appropriate national competent authority, such as the Ministry of Foreign Affairs, national atomic energy commission, or other competent authority. Please remember to submit completed forms to the national authority for transmittal to IAEA. Forms should *not* be submitted directly to IAEA.

Participants submitting a paper should note that the deadline for IAEA's receipt of the completed forms for submission of a paper – as well as six copies of an extended synopsis – is 1 October 1985.