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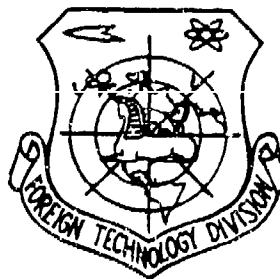
FOREIGN TECHNOLOGY DIVISION



MILITARY ENGINEERING EXHIBITION BY PIRELLI GROUP OF ITALY

by

Zhu Mian



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## MILITARY ENGINEERING EXHIBITION BY PIRELLI GROUP OF ITALY

Zhu Mian

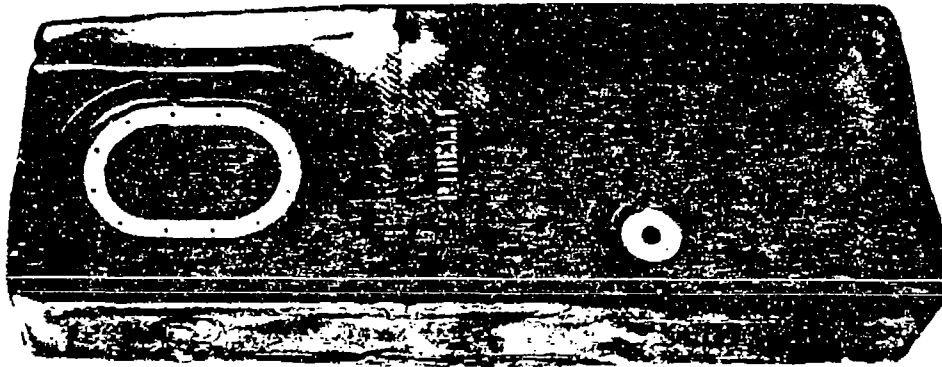
XIANDAI JUNSHI [CONMILIT]

The Pirelli Group of Italy has been world famous in manufacture of rubber products, especially automobile tires. However, the group plays a major role in the defense industry. In promoting international recognition of the group, a two-day invitation-only exhibition was held in mid-June at the Italian Trade Center in London. Among invited guests were foreign military attaches stationed in Britain, and a group of reporters of military journals and publishing houses.

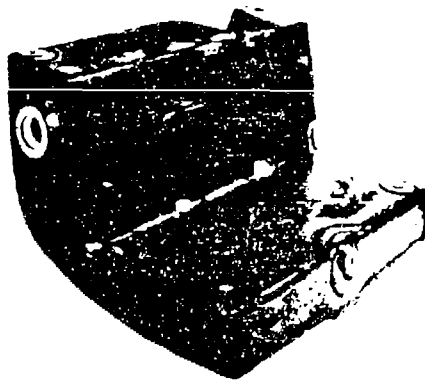
The main purpose of this exhibition is to show the Pirelli group's major exposure in the military hardware industry by introducing a number of new products along with other series of military supplies. Basically, products of plastics and synthetic fiber were the key items with various versions. We can imagine that tires for military vehicles and combat aircraft are the main items; the Pirelli group supplies almost all Italian military needs in tires, including the rubberized metal wheels for tracked vehicles.

The unique product in the exhibition is the composite fiber self-sealing fuel tank for combat aircraft. If small punctures occur to a self-sealing fuel tank either during combat or in accidents, the elasticity of the rubber-like resin can seal the punctured hole, avoiding fuel leakage. Although this design

has been applied as early as during World War II, the light weight and superior quality of Pirelli products lead to a status of superiority on the market. At present, the Hawk trainer/interceptor plane of the United States, as well as the Tornado and model CH-47 helicopters (jointly built by Britain, Germany and Italy) are the main flight vehicles using Pirelli products outside the Italian market. This self-sealing fuel tank can withstand fire from as big as a 20-millimeter caliber gun. In addition, there are non-self-sealing, light-weight and flexible fuel tanks, which can be made in a complicated shape in order to more effectively utilize space inside an aircraft.



Self-sealing fuel tank of Pirelli.

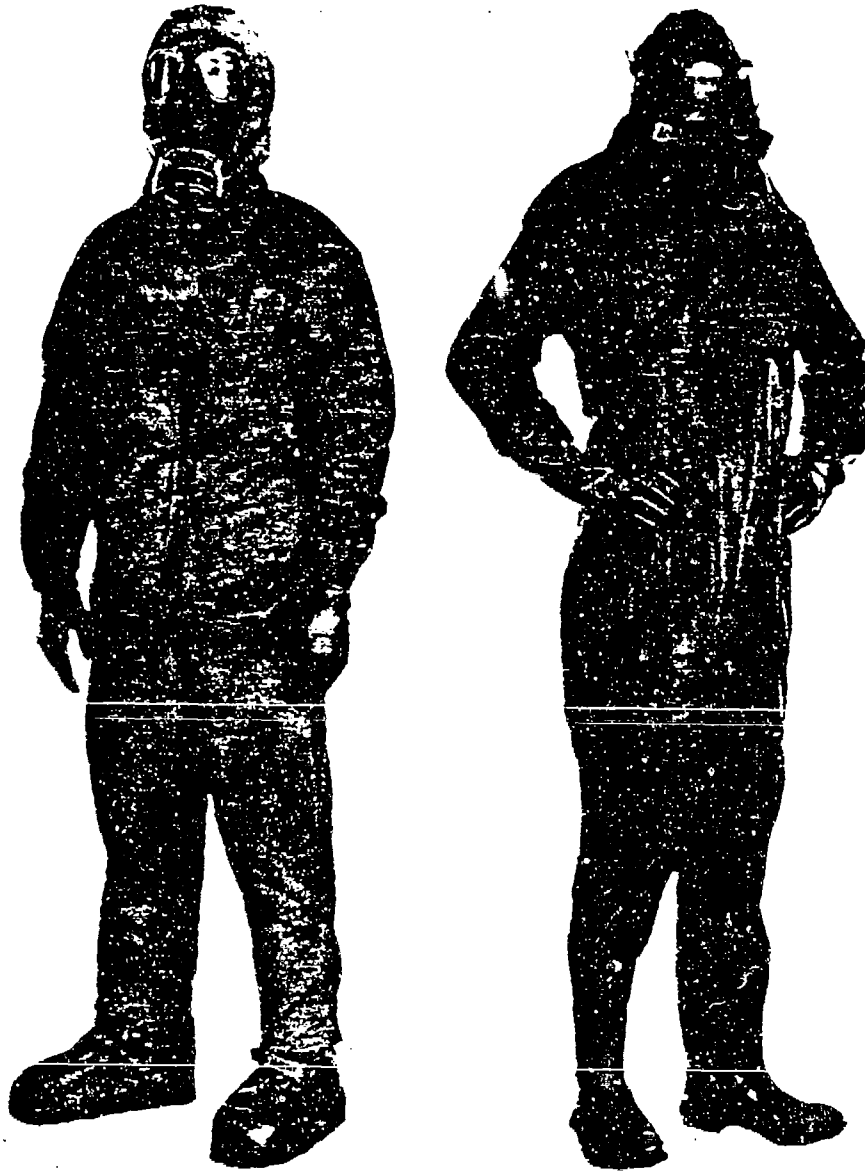


A Pirelli composite fuel tank.

The Pirelli group has also developed nuclear/biochemical protective equipment. At the exhibition, a large number of respiratory devices were displayed, including various models of gas masks, as well as air filters for medium- and small-sized shelters for nuclear warfare. Sekur S. p. A. of the Pirelli group occupies an important position in development in this field. The use of chemical weapons in a future battlefield is almost a certainty; an attack with chemical warfare will be a means of surprise. Therefore, in order to cope with a surprise attack of chemical agents, soldiers should be able to wear protective gear for a long time without movement being hindered. Moreover, this gear can be immediately and effectively worn. These requirements are heeded in the design approach of the Pirelli group. Besides the respiratory apparatus among the individual protective equipment, there are clothing and shoes. One of the key exhibit items was a recently-designed suit, providing protection against nuclear/biochemical warfare.

#### The Nuclear/Biochemical Protection Suit

The nuclear/biochemical protective suit can be considered the best designed product among the exhibited items; the suit is light and comfortable to wear. Discarding the traditional design of gas tightness, the suit uses sandwiched material. The exterior layer is a high-strength synthetic fiber, providing water- and oil-proofing, along with protection against conventional chemical spraying and in extreme climates. The middle layer is a thin glass fiber providing protection against fire and thermo-radiation flash as reflected from a nuclear detonation. The inner layer is made of emulsion, having numerous tiny spaces filled with active powdered carbon for absorption of poisonous gas. Since the material used is gas permeable, the suit allows normal respiration of skin and evaporation of perspiration. The protective suit is not much different from a conventional overcoat. Therefore, the suit can be worn for a long time without hindering soldiers' activities during combat. At present, the NATO countries adopt the nuclear/biochemical protective suit made in Britain; the suit is regarded highly by the user countries. However, the Pirelli group believe that their suit is superior in quality and will eventually displace the British product in the future.



Pirelli special purpose suit is fully impermeable to any nuclear/biochemical agent, even in liquid form.

Pirelli's nuclear/biochemical combat suit.

#### Security System for Military and Other Important Facilities

A Pirelli subsidiary, Boselli Corporation of Milan developed these security systems, as it has reliable experience in the security field, developing from

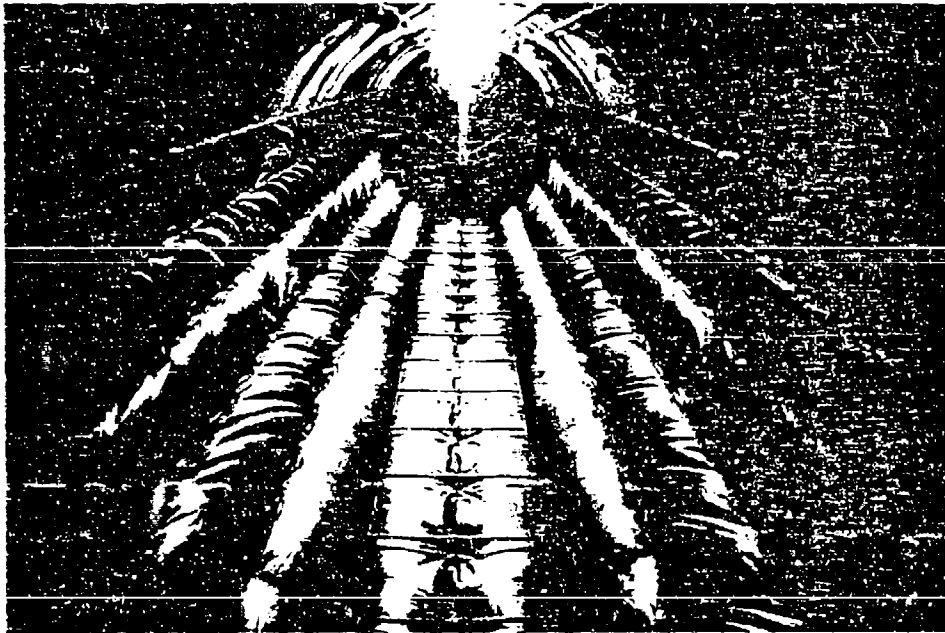
many years' work on bank security into military systems, which stress simplicity and reliability. The simplified procedure reduces the probability of false alarm and difficulty of maintenance, thus providing convenience in operation. The security safeguard includes prevention of unauthorized penetration into the bases and leakage of secret information. In some systems, there are closed circuit television, receipt and transmission of coded messages, area shielding, passage control, and fire-prevention systems. In addition, the Boselli corporation conducts design and construction of integrated buildings, such as computer centers, and combat and supply centers, among others. Boselli can also supply advanced equipment, such as an electronic defense network, antenna system (electric capacitance or electrostatic charges) capable of detecting objects of a certain volume, microwave system, atmospheric pressure devices detecting pressure variation at the ground, and an inertia system for detecting special oscillation, among others. In meeting requirements of different aspects, there are a magnetic coded discriminatory card, discrimination codes in electric waves, as well as discrimination of graphs and palm prints.

#### Underground Storage Facilities for Liquids

These underground facilities are mainly to store fuel oil or drinking water. DECA is a storage facility capable of quick erection by utilizing natural or artificial caves for storage. Often, navies utilize coastal caves for oil storage. However, conventional underground oil storage requires large-scale civil-engineering construction, as leakage prevention becomes a long-term problem. Caves without treatment may cause leakage of fuel oil. Usually, concrete lines the cave wall; this approach requires not only a long time, but also may still leak oil due to breakage at spots. The Pirelli group conducted exhaustive research on this problem, and finally the DECA system was developed, using rubber-like fiber material as a flexible membrane for leak-proofing.

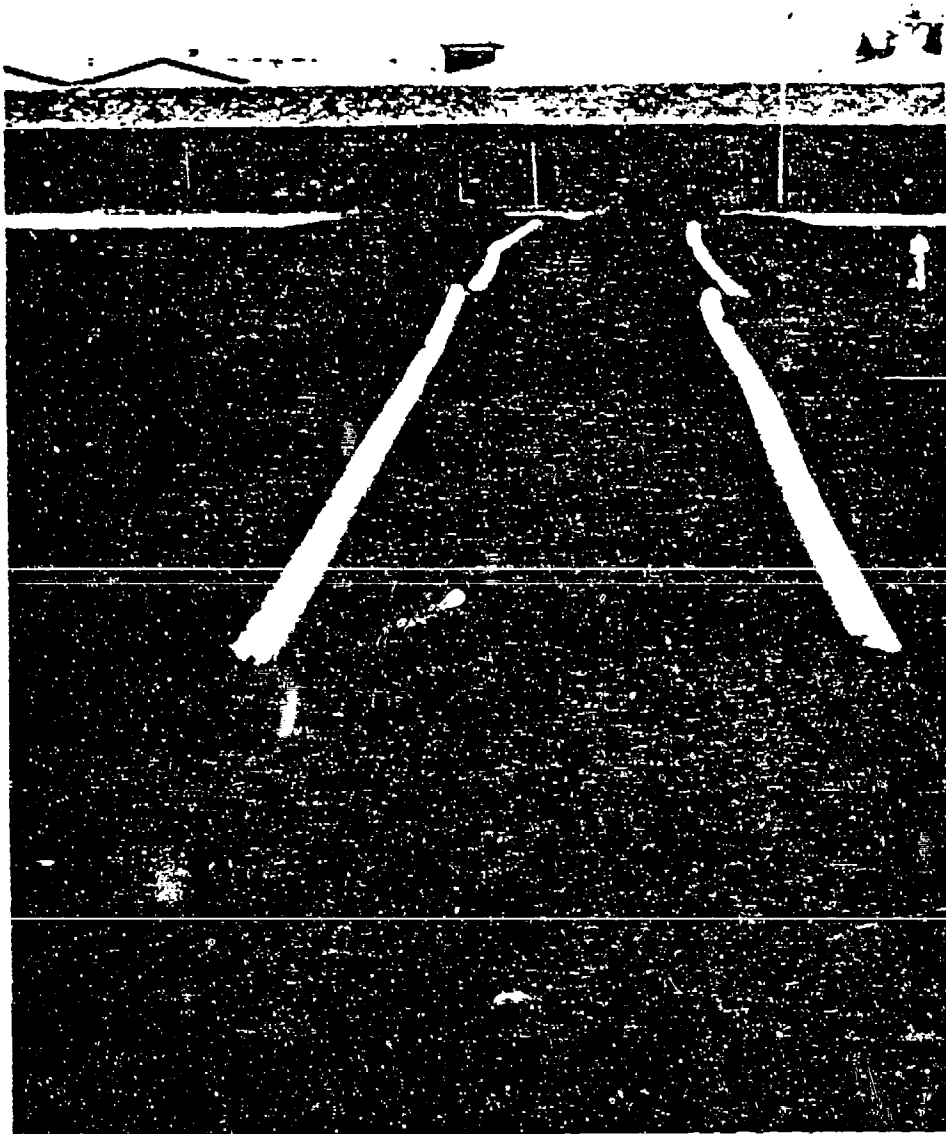
In the construction procedure, first the general shape of the cave is measured; a flexible membrane of appropriate dimensions is then cut and made. Then, a supporting frame and hooks are installed along the cave wall. The membrane is filled with air before positioning. The supporting attachment is

then connected. The project is completed only after dismantling the air-filling machinery and installation of the transmission pipeline. In this way, the construction time is ten times faster than conventional civil construction; in addition, the degree of water tightness is very high. Other advantages of this approach include the pre-testing of component quality and reliability without waiting for completion of the entire project.



Interior view of the DECA rubber leakproof system.

The thin membrane does not reduce the cave volume. Since the cave wall is only used for support, cracks and holes do not in any way cause oil leakage. The material of the thin membrane will not contaminate the oil stored, and does not cause temperature variation. Therefore, the oil can be stored for a long time.



Exterior view of the surface layout of the DECA system.

At present, the DECA system has been used by two NATO countries with an approximate storage capacity of 100,000 cubic meters (corresponding to 100 million liters or 22 million imperial gallons). Users are satisfied with the system.

The Pirelli group is also a major producer of electric cables and conductors, including the advanced optical fiber technique; most Italian warships use its electric conductors. Other items exhibited include various types of threshold tubes and connections (adaptable for high temperature, high pressure and oil transmission), and some miscellaneous items, such as rubber boats, helicopter floats, camouflage equipment and other products related to chemical fibers.

#### Conclusion

The Pirelli group makes key military supplies, not weapons of vast power. These products are a necessary sector of the military industry.