The Armour Plan

ARMOUR RESEARCH FOUNDATION OF ILLINOIS INSTITUTE OF TECHNOLOGY had modest beginnings in the depression year of 1936. It has since grown steadily from three small rooms at Technology Center on Chicago's near South Side to a large center of organized scientific and engineering research. Annual research appropriations totaling more than $9,000,000 now enable a staff of more than 1000 full-time members to conduct many long-range research programs in practically all fields of physical and chemical science.

This nonprofit organization serves industrial concerns and government agencies by acting as an extension of each sponsor's laboratory. Under the Armour Plan, a diverse professional staff systematically collaborates on individual projects, and because of this diversity increasing numbers of sponsors have found specialized research organizations such as the foundation both economical and effective for solving important research and development problems. The variety of scientific equipment and the range of scientific disciplines available increase the chances for research success. Such research projects as trace elements in meat, the flow of molten metal, palm oil substitutes, roller chains, corrosion of metals, and lightweight concrete aggregates will serve to give some indication of the breadth of the foundation's research effort.

The investigation of trace elements in meats is sponsored by a national business association interested in determining the mineral content of the various cuts and grades of beef, lamb, pork, and veal. The analytical tool used in this work is the emission spectrograph. The first phase of the program, recently completed, showed that beef, for example, contains some 20 trace elements, in concentrations ranging from about one part per billion to a few tenths of 1 per cent.

A theoretical and experimental exploration of the flow of molten steel through various gating systems used for production of steel castings has resulted in the development of a design theory that permits prediction of flows within about 5 per cent. The theory also permits calculation of mold-filling times within an accuracy required by the practical foundryman.

The search for a domestic product to replace palm oil in hot-dip tin plate manufacture has led to discovery of a promising new substitute derived from white grease, which may contain substantial quantities of pork fat. A substitute previously developed by the foundation uses beef tallow as a starting material.

Objective of the research on roller chains is the identification of certain basic factors and mechanical effects influencing chain life that will be useful in determining chain design, material specifications, and chain-drive capacities. In the initial phase of the program, instruments were devised for measurement of forces on chains in motion. A large chain testing machine also was built and used with the instrumentation.

The problem of corrosion of metals is being attacked from several points of view. Apparatus has been devised that gives a better insight into the manner in which metals corrode. Corrosion inhibitors for various applications are being tested. Several projects are concerned with development of lightweight aggregates for concrete mixes. Many raw materials and processing techniques have been examined, resulting in production of a number of aggregates combining light weight with strength.

This wide variety of investigations continually challenges and invigorates the staff. There is no time for stagnation when new demands are made each day on the foundation's capacity and on the ingenuity of its personnel.

Foundation expansion has brought about the formation of four divisions: Materials and Processes Research, Engineering Mechanics Research, Physics and Electrical Engineering Research, and the International Division, which handles industrial research programs outside the United States, furnishing to other nations the same research and engineering service available in this country.

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