Some research projects on concrete and related subjects now being undertaken in Great Britain and Northern Ireland

This list of research projects now in hand in Great Britain and Northern Ireland fulfils one of the original aims of this Magazine in keeping research workers informed of what their colleagues are doing elsewhere. It is intended that a list of British research projects shall be an annual feature of the Magazine and it is also hoped to publish details of work being carried on abroad.

Universities

CAMBRIDGE

- Creep of concrete
- Vibration of concrete

DURHAM — **King's College**

- Bond in prestressed concrete
- Grading in vibrated concrete
- The effect of vibration on the properties of concrete and mortar

LEEDS

- The elastic and plastic properties of heat-treated concrete
- Composite construction in prestressed concrete
- The distribution of bond stress in prestressed and reinforced concrete members
- The ultimate strength of conventional reinforced concrete beams in shear
- The ultimate strength of prestressed concrete beams in bending and shear

LIVERPOOL

- Scaling in concrete structures
- Corrosion in concrete

LONDON — **Imperial College of Science and Technology**

- The design of shell roofs
- Fundamental characteristics of plastic hinges
- Continuous prestressed concrete construction
- The re-distribution of bending moments due to inelastic behaviour in reinforced concrete continuous beams
- Study of plastic theory by bending simulation
- The strength of prestressed beams in shear
- The plastic theory of frameworks
- Design of concrete mixes
- The location of plastic hinges in frameworks
- Ultimate strength of non-bonded prestressed beams
- Vibration of concrete

King's College

- Creep of concrete under systems of two-dimensional stress
- The electrical curing of concrete
- An analytical investigation of shell structures
- Vibration of concrete

Queen Mary College

- The use of ultrasonics in ascertaining the physical properties of concrete
- The plastic design of reinforced concrete structures
- Non-bonded prestressed concrete made up from short sections

University College

The measurement of energy absorption by fresh concrete during vibration

The measurement of the properties of hardened concrete by sonic and ultrasonic methods

The determination of the significance of the concrete compression test

Battersea Polytechnic

Bond strength and slip in prestressed concrete beams

The creep and shrinkage of concrete at elevated temperatures (up to about 150°C)

The effect of distribution of stress in a concrete on the apparent maximum stress at failure

Northampton Polytechnic

The distribution of load in steel embedded in concrete

An investigation into the existence of model laws for the process of concrete mixing

NOTTINGHAM

The distribution of bond stress

The distribution of stress in reinforced concrete beams

SHEFFIELD

The strength of prestressed concrete in torsion and combined bending and torsion

The ultimate strength of encased steel beams in combined bending and torsion

Prestressed concrete portal frames

Cambered concrete beams prestressed with straight bars

The ultimate strength of eccentrically loaded reinforced concrete columns

The effect of shear reinforcement on the torsional strength of encased steel beams

The strength of rectangular reinforced concrete slabs supported along two sides and acted on by an unsymmetrical concentrated load

WALES **University College of South Wales and Monmouthshire**

The effect of prestress on the crushing strength of cement mortars

ST. ANDREWS **University College**

The distribution of stress in post-tensioned prestressed concrete beams during the stressing of the high tensile reinforcement and under load up to failure

The effect of sea water on prestressed concrete beams under load

The measurement of the distribution of transverse bending and longitudinal stresses on model shell roofs

QUEEN'S (BELFAST)

Soil-cement stabilization.

Road Research Laboratory Department of Scientific and Industrial Research

MATERIALS

The effect of size of specimen, method of test, aggregate shape and other factors on the flexural strength of concrete

The effect of type of testing machine on the recorded compressive strength of concrete

Development of accelerated freezing and thawing tests and a study of the behaviour of concrete during freezing and thawing cycles

The effect of admixtures on the properties of concrete with special attention to air-entraining agents and wetting agents

The extension of the non-destructive testing of concrete by ultra-sonic methods, already used as a routine laboratory test, to the measurement of the thickness and quality of concrete slabs *in situ*.

Investigation of the possibility of changing the properties of concrete used in road work so that the hardened concrete would be less liable to crack

Examination of methods of controlling the quality of concrete

An examination of the amount of segregation occurring in concrete mixes when the characteristics of the mixes are changed

PLANT

Concrete mixers—development of tests to measure the efficiency of mixing and the use of the tests to examine the performance of existing machines and to investigate the fundamental requirements for good mixing

Spreading machines—development of tests to measure the uniformity of spread concrete and to determine the effect of spreading on the riding quality of concrete roads

Compacting machines—determination of the effects of various forms of vibration on the compaction of concrete road slabs, to obtain data enabling improvements to be made in the design of concrete compacting machines

Road forms—development of improved techniques for setting and aligning road forms to reduce the inaccuracies which at present result in a poorer riding quality than should be attainable

The study and measurement of the effects of various methods of transportation on concrete mixes

DESIGN OF CONCRETE ROAD SLABS

Full-scale experiments on the structural design of concrete roads:—
(*a*) to determine the most economical thickness for particular soil and traffic conditions
(*b*) to examine the effect of several weights and arrangements of reinforcement in slabs of various lengths
(*c*) to obtain data on joint movements and so determine the minimum number of joints needed to prevent cracking or compression failures

Determination of the effect of temperature changes on the warping and longitudinal movement of concrete slabs

Measurement of the movements of prestressed concrete road slabs and determination of the distribution of strain around tendon anchorages

Development of improved methods of joint construction and measurement of the effectiveness of load-transfer devices

Correlation of design and construction of concrete roads with their long-term performances

Investigation of the causes of failure of precast concrete kerbs.

Building Research Station, Department of Scientific and Industrial Research

MATERIALS

The constitution of Portland, high alumina and slag cements and the atomic structure of cement minerals

The chemistry of hydration of cements and the structure of hydrated cement compounds

The constitution of blastfurnace slag used as aggregate or cement raw material

The mineralogy of sands and aggregates

The production and utilization of lightweight aggregates such as furnace clinker, foamed slag and expanded clay

The rheology of lime, cement and mortar pastes

The effect of workability aids and air entrainment in concrete

UTILIZATION

Compaction of concrete by vibration

Methods of handling materials in building operations

Quality control of concrete

Effect of steam curing on properties of concrete

Factors affecting concrete durability and chemical resistance

Problems of external renderings and cement paints; painting asbestos cement

Thermal effects in mass concrete structures such as dams, oil reservoirs, etc.

The location and design of expansion joints and joints in water-retaining structures

The wear of domestic and industrial floors. Study of the forces exerted by foot traffic on floor surfacings. The impact resistance of concrete

The bearing capacity of short bored piles and a study of their economics

DESIGN OF STRUCTURES

The strength of concrete walls and its variation with dimensions, arrangement of the reinforcement and load eccentricity

The design of reinforced concrete frameworks

The strength of concrete-encased steel girders

The stiffening effect of cladding, floors and walls in composite structures

Strength and fire-resistance of prestressed concrete

Analysis of stresses in shell constructions and their study by model techniques

The strength of steel and concrete bridges

Development of structures for reduction of sound transmission

Measurement of heat transmission through walls and roofs, and the thermal conductivity of materials.

Cement and Concrete Association

STRUCTURES

Comparison of reinforced and prestressed concrete for certain structures including bridge decks and flat slabs

Design of shell roofs

Examination of the efficiency of various joints for water-retaining structures

Determination of stresses in foundation beams and slabs

Determination of strength of anchorages used in prestressed concrete

Development of methods of prestressing concrete roads

MATERIALS AND COMPONENTS

Study of the effect of steam curing on the rate of development of strength of concrete

Study of the properties of high strength concrete cured under normal conditions

Preparation of tables for the design of concrete mixes made with aggregates of $\frac{3}{4}$ in. maximum size

Effect of admixtures on the properties of concrete and their use in improving the quality of concrete

Methods of determining the moisture content and absorption characteristics of aggregates

Measurement of aggregate particle shape and texture

Effect of natural soft acid water on various types of concrete

The causes of efflorescence and methods of preventing its formation on mortars and concrete

The development of textured surface finishes for concrete, including precast concrete, *in situ* concrete and renderings

Study of fundamental physical aspects of the structure of hardened concrete.