

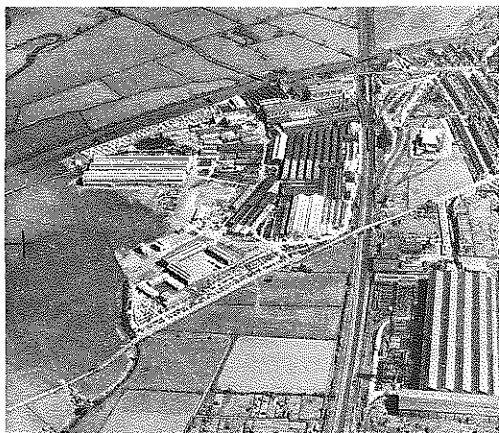
Opportunities at Brush

INTRODUCTION

Over 5,000 people are employed by Brush and its associated factories, the majority being at Loughborough.

Brush is part of the Plant Division of Hawker Siddeley Electric whose other Companies include Crompton Parkinson and Fuller Electric. The total Hawker Siddeley Group has some 116,000 employees and a turnover of over £1M. per day and is among the largest industrial organisations in the world. The main interests are divided between aero space manufacture under Aviation and Dynamics and industrial interests grouped under Diesels, Electric and Holdings, the latter covering general engineering product Companies.

Each Company within Hawker Siddeley has an autonomous Board of directors responsible for its management, with exceptional freedom for decision making.



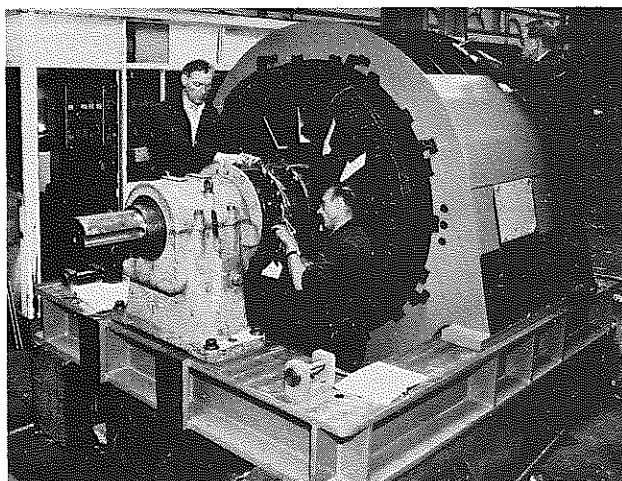
Aerial photograph of the Falcon Works

PRODUCTS

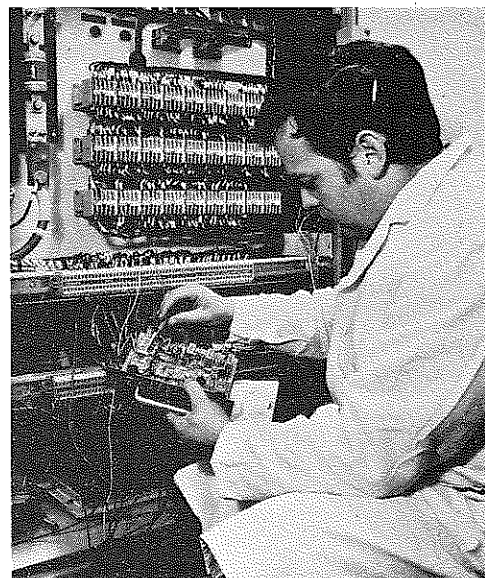
The products designed and manufactured at Loughborough concern generation, control, transmission, and utilisation of electricity. They include:-

Rotating Electrical Machines

Many types of rotating electrical machines are manufactured. These range from 1kVA to 40,000 kVA alternators for coupling to diesel engines or turbines, up to 10,000hp induction motors for driving a wide range of mechanical equipment, and up to 3,000hp D.C. machines for use in drives where speed variation is required.



Assembling a 12 pole, salient pole, synchronous induction motor



Brush "Varisil" thyristor drive cubicle

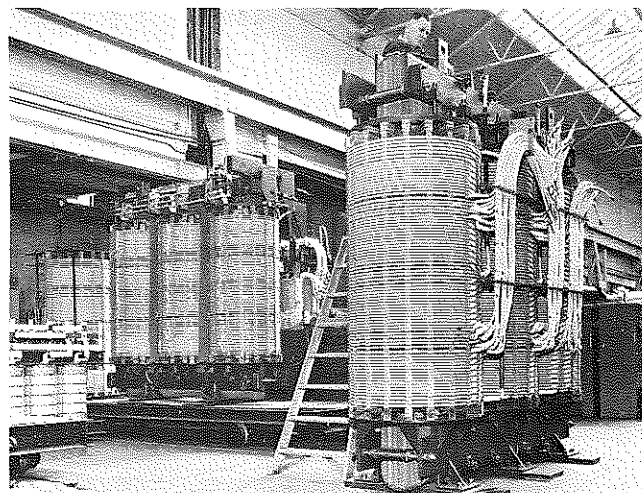
Control Gear

The products of this department include:-

Variable speed drives, mostly thyristor controlled; the largest installation to date being a thyristor controlled A.C. machine of 2300hp. These drives are applied to many process industries throughout the world, and also to special test rigs, pumps, fans, and machine tools.

Synchronous machine excitation equipment. This type of equipment also includes semiconductor circuitry for the control of diesel generating power stations.

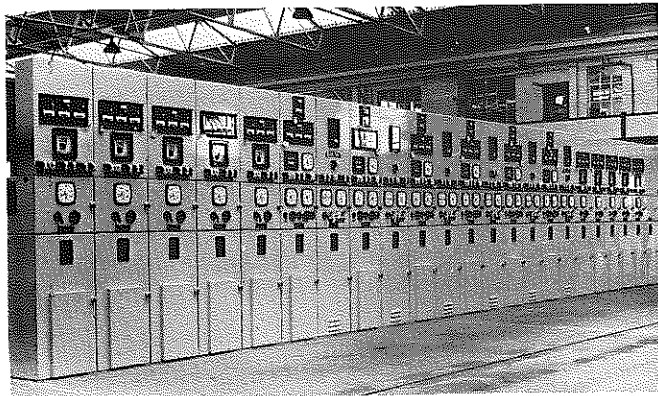
Protection and monitoring equipment. This range of equipment comprises automatic synchronising units, and relays for tap changer control, earth leakage detection and over current protection.



16/20 MVA Transformers under construction for Copenhagen Lighting Department.

Transformers

A wide range of distribution and system transformers is manufactured from 200kVA up to 30MVA. Brush also cater for a complete range of flameproof mining transformers with Switchgear up to 6.6kV. Interesting development work on cooling, noise abatement, the use of new materials and new types of insulation is continually being undertaken.



24 Panel V.S.I. Alternator Control Board.

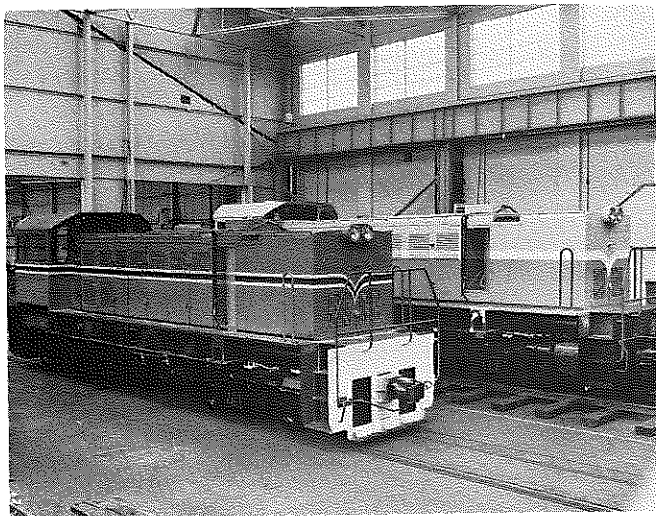
Switchgear

Brush manufacture a range of switchgear up to 33 kV, for indoor and outdoor use, with fault capacities up to 1000 MVA.

The 11kV range includes oil circuit breaker units used by the Area Boards, industrial and overseas customers for primary and distribution substations, whilst the outdoor 11kV range covers the type of equipment used by Area Boards for rural and urban distribution network and by many customers overseas.

The M.V. range covers air-break switchgear and fusegear to meet the requirements of industry and commercial installations such as hospitals, office blocks etc., and covers the most modern technique of using current-limiting circuit-breakers for very high fault levels. The M.V. range also includes switchgear designed specifically for the Ministry of Defence for use in H.M. fighting ships.

The Company has a modern Short Circuit Testing Station with a capacity of 350MVA at 11kV for development, testing and certification of the products of the Division.



1500 H.P. S1 Locomotive for shunting and switching duties

Brush Traction

Product range - diesel electric locomotives for main line, shunting and transfer duties 200-4000hp plus. The division manufactures equipment and components for diesel electric locomotives and control equipment for diesel hydraulic locomotives, also power equipment for rapid transit stock.



'Kestrel' 4000 H.P. Diesel Electric Locomotive for freight and passenger service.

Brush-Kone

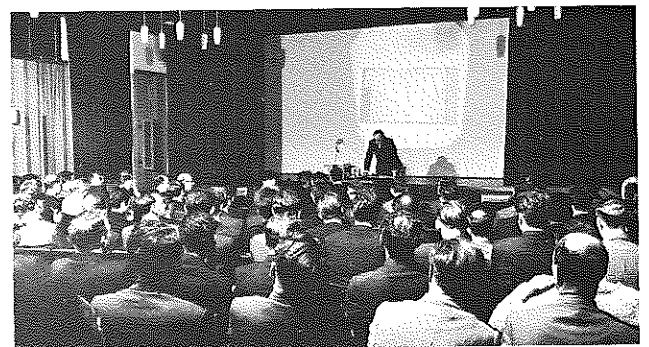
The Brush-Kone Division specialises in the marketing, manufacture, erection and servicing of lifts, escalators and paternosters under licence from Kone Oy, Helsinki, Finland. The product range is wide and includes passenger, goods and service lifts, hydraulic as well as electric, geared and gearless drives up to 800ft/min.

The Brush Electrical Engineering Company is founded on traditions of experience and skill of the highest order. Its future is dependant upon the most effective use of personnel at all levels. To ensure this, schemes of training and education have been evolved within the company to provide opportunity for progress second to none. Facilities for sound training, backed by a competent and adequate staff, exist within the Company.

This publication describes in detail the purpose, pattern and content of the several schemes of training offered.



Training Centre Foyer



Training Centre Main Hall

CAREERS IN DESIGN AND DEVELOPMENT

In the design of a product the determination of shape, strength and systems for control calls for a close interaction between engineers of all disciplines and with the product of scientific investigation carried out by physicists, metallurgists and mathematicians. Known techniques of design need to be advanced and refined, urged by the continual challenge of success in a market which is highly competitive. For the trainee, this interaction within a wide range of science and technology offers the facility for a well-founded education leading to a satisfying and absorbing career.

Some Specific Activities are:

Design and development of switchgear necessary for the control and production of transformers, motors, alternators, etc.

Design and development of transformers including work on cooling, noise abatement and new types of insulation.

Design and development of rotating machines:-

Alternators 1kVA to 40,000 VA

Induction motors up to 10,000 h.p.

D.C. machines up to 3000 h.p.

Design and development of:

Variable speed drives, mostly thyristor controlled, D.C. and A.C. machines covering many applications and a wide power range:

Synchronous Machine Excitation Equipment.

Protection and Monitoring equipment. This range of equipment comprises automatic synchronising units and relays for tap changer control, earth leakage detection and over current protection.

CAREERS IN PRODUCTION

The culmination of design is in the manufacture of a product at the right cost, at the right time, and one which meets the highest standards of workmanship. To meet these specifications production must be carefully planned and controlled. This work is carried out by production engineers who convert the information received from the design departments into a reliable and effective product as quickly and economically as possible. Full use is made of modern computing facilities so that planning data can be handled rapidly and control made more effective.

During the design process the production engineer advises on manufacturing techniques. His advice may radically alter the design so that existing production facilities may be fully utilised. On the other hand he may be required to develop new methods of manufacture and to design new machinery and processes. The work demands considerable ingenuity and sound engineering knowledge. This work is essentially for the practically minded engineer affording considerable scope in the advancement of production technology.

The detailed work of a Production Engineer is:-

Production Planning and Control

Determination of overall production time cycles to meet scheduled delivery dates; requirements of manpower, factory layout, machinery and equipment. Determination of specific plans for each workshop area. Liaison with the purchasing department for the supply of material and sub-contract manufacture. Control of tool manufacture. Control of component manufacture and assembly sequences to meet the production programme; spares manufacture.

Production Engineering

Liaison with design departments to determine economical methods of manufacture. Process engineering; determination of sequence of operations for manufacture of each component and assembly; tool requirements. Jig and tool design; to ensure ease of assembly, continuity of quality and the interchangeability of com-

ponents and sub-assemblies. Design and development of new production techniques.

CAREERS IN COMMERCE AND FINANCE

The design and productive effort has no validity unless it is backed by an organisation capable of effective commercial administration and financial control. Such is the importance of these activities that over recent years a comprehensive pattern of training has been evolved comparable to the well established schemes of engineering training. This training ranges from clerical to professional courses and includes industrial training integrated with full time education up to and beyond degree level.

A career in commercial and financial administration within industry ultimately offers a breadth of activity far wider than the traditional professions in this field and as such may provide a more interesting career to those who wish to gain not only a sound qualification, but a wider scope in which to apply their abilities. Such activities include:-

Commercial Administration

The commercial departments are responsible for two main functions. First to secure customers by negotiation both at home and overseas. Potential customers require information concerning the actual performance and engineering aspects of the products, operating economics, spares supply and technical support, and full knowledge of the delivery period and financial conditions applicable to the sale. Secondly, after a contract is signed, the commercial departments are required to administer its progress during both the technical and production programmes. Such work includes close association with design and production planning groups, the purchasing of raw material and machinery, the negotiation of sub-contract manufacture and effecting production cost control.

Financial Administration

Within any company the effectiveness of the enterprise is measured in terms of money and the accountant is required to collect and interpret this information. He must record and analyse actual information such as the cost of material entering the factory, labour and general services, and, from the relationship with income through sales, prepare profit and loss accounts. He must be able to present management with a picture of current and future trends by continual estimation of figures based on past events, cash investment, cost of production and the order-book position. As information is now becoming more rapidly available through the use of data-handling machinery the accountant will be asked increasingly to provide updated information for the close control of cost.

CAREERS IN COMPUTING AND DATA PROCESSING

Problems associated with the complex and theoretical aspects of design often require advanced analytical and computer techniques for their solution. To reduce the more routine work of engineers, many simpler calculations have also been adapted for solution by computer.

Similarly, in both the commercial and financial functions, much of the routine paperwork is processed by machinery. As the application of computers and the way in which management use these facilities advance, there will be a growing demand for those with proven ability in mathematics as well as a knowledge of business systems to apply themselves to Systems Analysis, Computer Programming and to Organisation and Methods.

The systems analyst or computer programmer must be prepared to apply himself to such systems as stores control, machine shop loading, wages, cost analysis or manpower planning.

As with mathematical programming, where a wider knowledge of engineering is useful, the data processing engineer is able to acquaint himself with systems of production planning and control, finance, commerce and design.