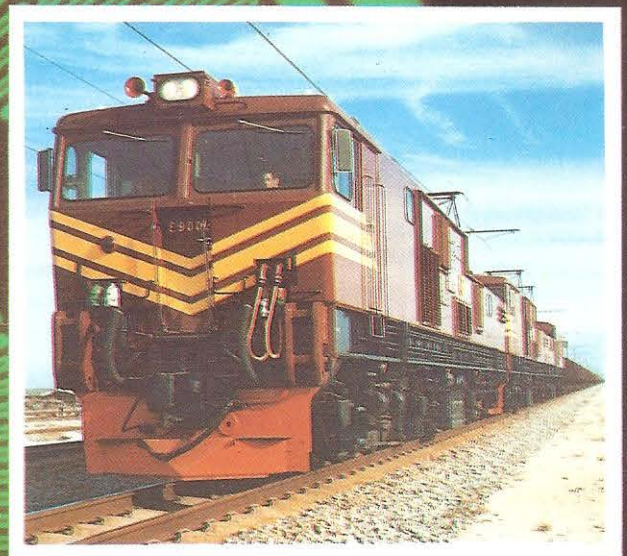
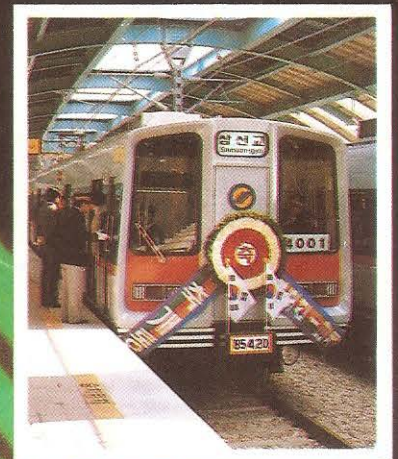


GEC in Transportation



GEC
Transportation
Projects

GEC
TRACTION

Front cover

The companies' roles increasingly involve marrying traditional heavy engineering with sophisticated micro processor control and power electronics. The cover illustration shows a section through a gate turn off (GTO) thyristor of the type being supplied for the Docklands Light Railway, for British Rail's new cross-London, "Snow Hill" services and others.

The General Electric Company plc is Britain's largest electrical and electronics company, with over 160,000 employees, annual turnover in excess of £6,000 million and over 130 specialist companies.

GEC's principal activities are grouped under seven basic classes of business:-

- electrical equipment
- power generation
- electronic systems
- telecommunications
- automation
- medical equipment
- consumer products

GEC Traction and GEC Transportation Projects are part of the Electrical Equipment Group which also contains companies manufacturing high voltage and distribution switchgear, transformers, rectifiers, reactor equipment and railway signalling equipment.

GEC Traction is the world's largest specialist manufacturer of electric traction propulsion equipment. In addition to its two factories in the United Kingdom, its products have been built under license in 16 countries.

GEC Transportation Projects are specialists in the design, execution and management of major railway and mass transit electrification projects around the world. They offer a completely flexible service to the customer ranging from the total control of a transportation project to providing specialist advice on specific system engineering tasks.

GEC Traction designed and manufactured the propulsion equipment for 67-6 car trains for the Seoul Subway. GEC Transportation Projects had overall responsibility for the vehicles themselves. They were also Managing Contractor (for overall management and system engineering) covering integration of the vehicles, power supplies, signalling and communications for Lines 3 and 4.

Projects

The prime role of GEC Transportation Projects is to co-ordinate comprehensive electrification projects, which may include up to thirty different GEC companies plus many more from outside the group. This central role is well illustrated by the diagram opposite.

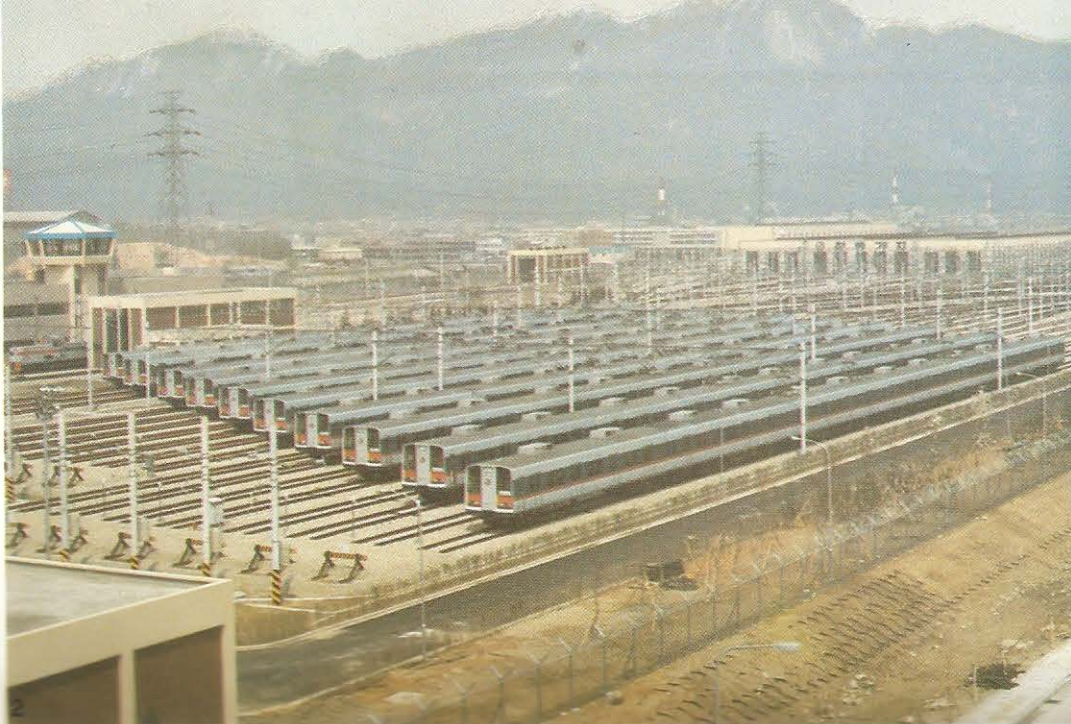
Recent projects have been carried out in Brazil, Korea, Mexico, Taiwan, Zimbabwe and the U.K. ranging from mainline electrification of a heavy haul mineral railway to the Maglev people mover at Birmingham. The Company has the capacity to undertake several projects simultaneously.

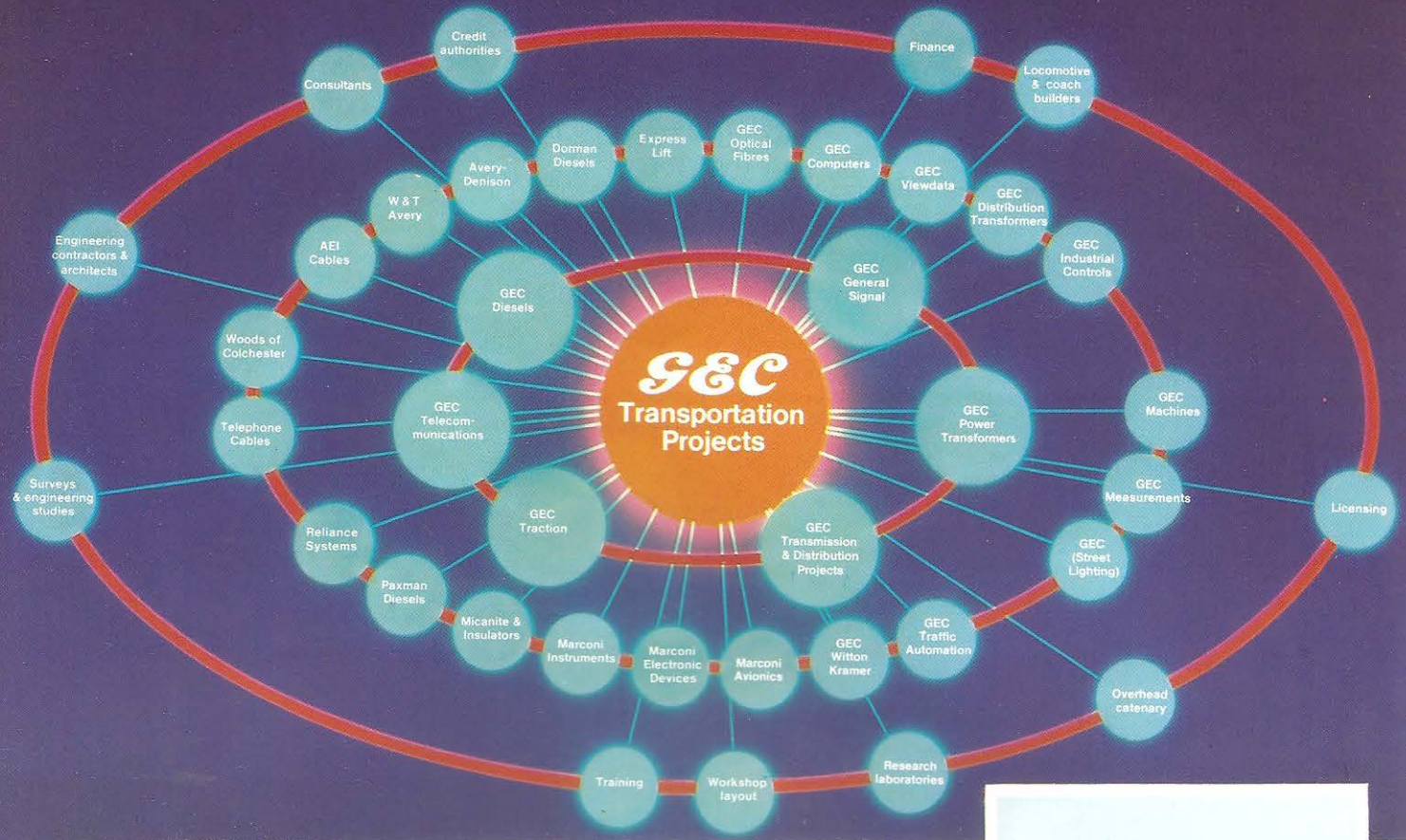
1, 2 & 3. In **Recifé**, Brazil the Company was responsible for the design and supply of rectifier substations, signalling and communications and catenary.

4. For **Maglev** at Birmingham the Company was responsible for project management and system engineering.

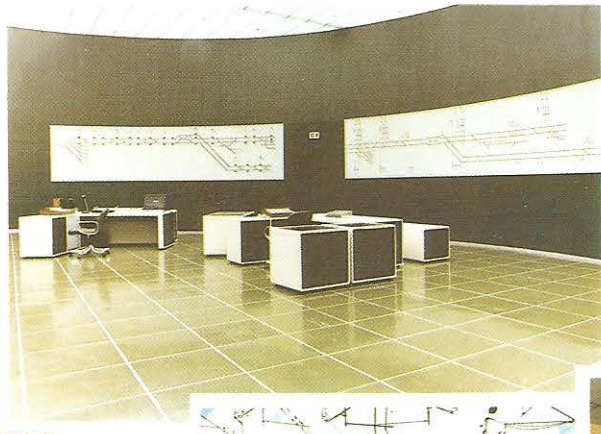
5 & 6. In **Taiwan** responsibility included all the power supplies and communications equipment as well as locomotives and luxury express multiple-unit trains.

7. Driver-training simulators were included in the contract for the **Seoul Subway**

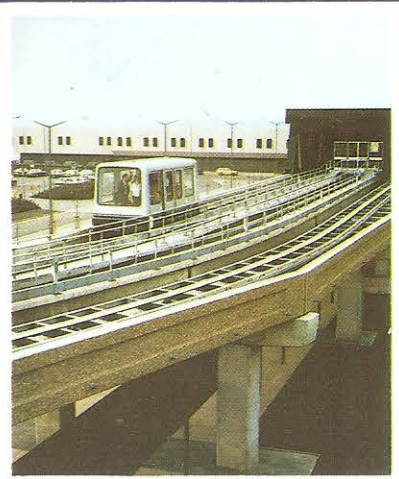




1▲



2▲



▶ 4



▶ 3



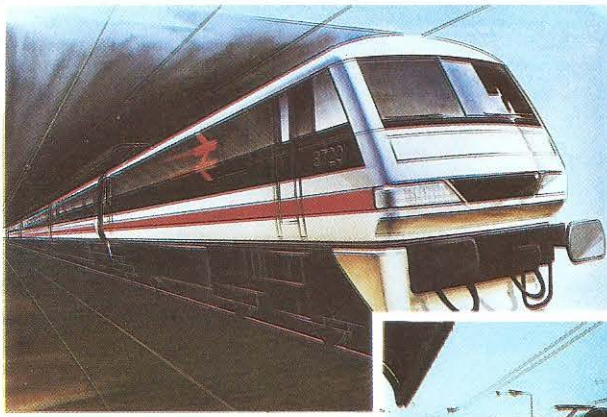
▲ 7



▶ 5

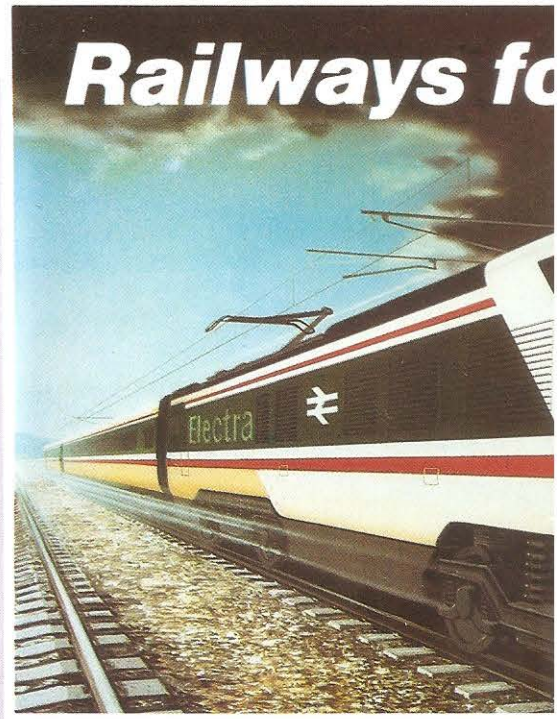


◀ 6



◀ British Rail Class 87/2
176km/h 25kV

British Rail Class 91 ▶
225km/h 25 kV



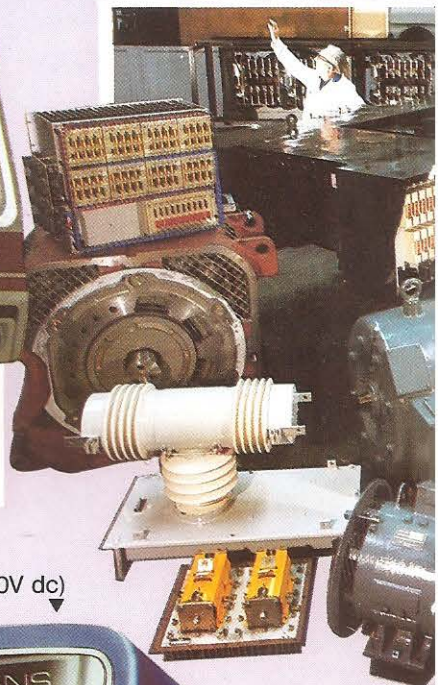
Railways fo



Tyne and Wear Metro ▶
(1500V dc)

Hong Kong Mass Transit Railway Corporation (1500V dc)

Equipment for six continents av



Docklands Light Railway (750V dc) ▼

Maglev, Birmingham ▲

◀ Class 10E locomotives –
South Africa (3000V dc)

Recife, Brazil (3000V dc)
▼



for the World



awaiting despatch from Preston Works

Taiwan (25kV, 60Hz) ▾



Kowloon - Canton Railway, Hong Kong (25kV 50Hz) ▾



VicRail, Australia (1500V dc) ▾

Seoul Subway, Korea (1500V dc) ▾



85.4.20

AMAX, U.S.A. ▾
(1400/600V dc)

Sishen - Saldanha Railway (50kV ac) ▾



Turkey (diesel electric) ▴

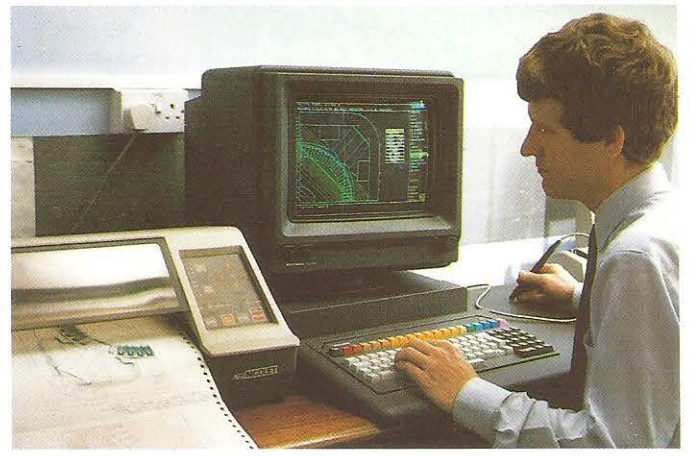


Sudan (diesel electric) - life extension project in 1985 ▾

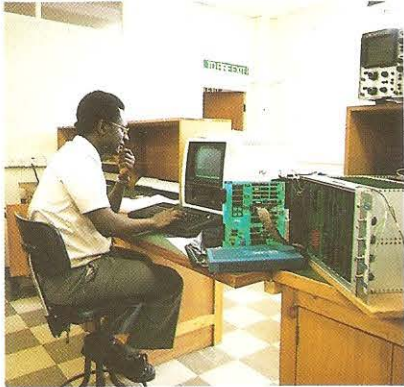


Design

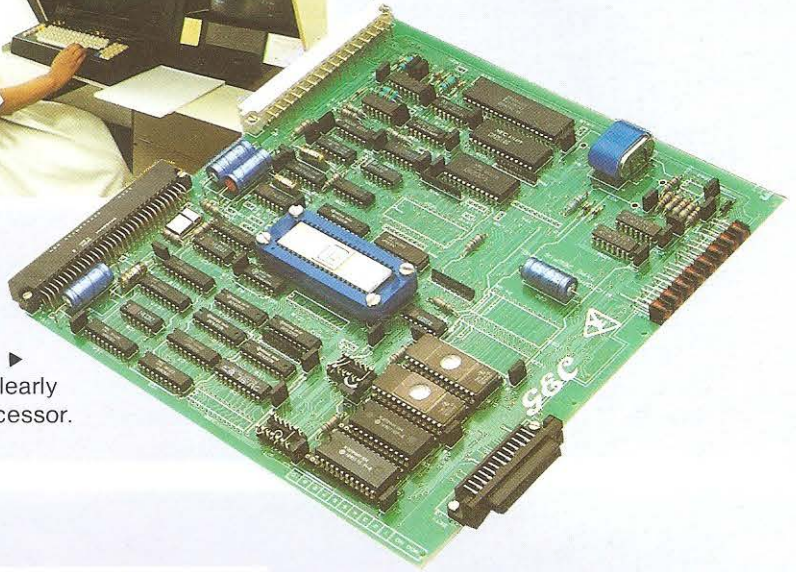
Computer aided design (CAD) is extensively used in the design of both machines and control gear.



Engineers at Trafford Park are actively involved in further developments of microprocessor control.



Close-up of a modern printed circuit board clearly showing the microprocessor.



Manufacture

Automated production of traction motor armature laminations.



Power semi-conductor assembly.



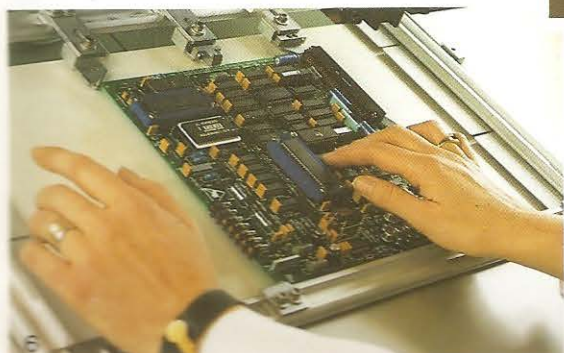
Armature winding.



Checking coordinates on the vee profile of a commutator.



Wire looming at Preston.

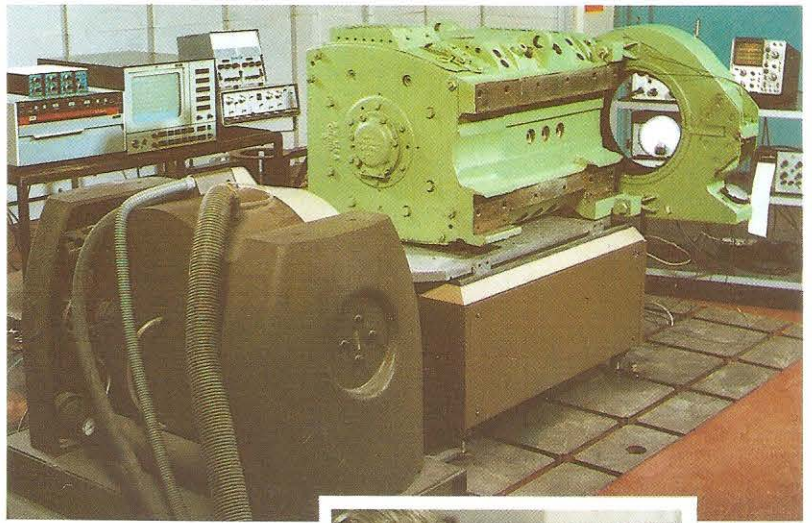


Printed circuit board manufacture at Trafford Park.

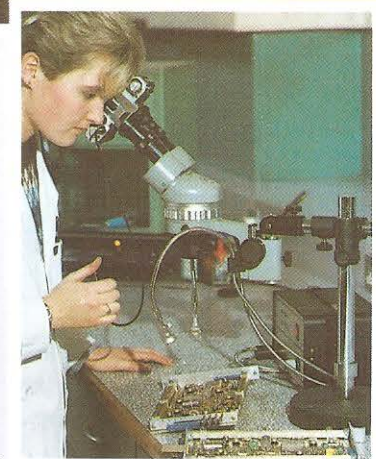


Development

The vibration testing laboratory at Preston has the capacity to subject all the company's products (machines, control components and control cases) to the full range of frequencies which might be encountered in service. ▶



The control room for the vibration laboratory. ▼



The materials laboratory. ▶

Test

Printed circuit boards are tested on the BEAVER automatic test equipment. ▶



The DITMCO computer aided test (CAT) units are tape-programmed, random access, wire circuit analysers which can carry out many hundreds of insulation, resistance and continuity tests on main equipment cases in only a few minutes. ▼

This computerised circuit verifier is used for the testing of electronic equipment frames. ▼



The combined test facility enables us to test complete vehicle sets of equipment. We can simulate full load operation, in real time over the actual routes concerned. ▶



Robert Stephenson & Company was established in 1823 and was the first Company in the world to be formed specifically for the design and manufacture of railway locomotives. It is just one of a large number of world famous Companies whose traction activities are now part of GEC.

GEC has also led the world in electric traction – a business it first entered in 1883. Among our more important developments are:-

- the world's first high voltage direct-current electrification – 3600V, Bury – Holcombe Brook (1915)
- locomotives for the world's first electrification at industrial frequency – Hungary (1931)
- the world's first export fleet of ac thyristor-controlled locomotives – Pakistan, 25kV, 50Hz (1969)
- the world's first substantial fleet of 50kV locomotives – ISCOR (1978)

The Company first supplied multiple-unit trains for "Underground" railways (or Metros) in 1898. It is today proud to have equipped the world's largest capacity Metro cars (for Hong Kong) and the smallest (Greater Glasgow).

The Company also supplied its first diesel locomotives in 1898. Since then it has supplied diesel locomotives to 35 State railways and to many more private railways. It introduced main line diesel traction to no fewer than 17 overseas countries as well as in the UK.

To date GEC and its predecessors have supplied or equipped more than 67,000 electric and diesel electric vehicles for service in no less than 76 countries:-

- 18 464 electric multiple units (suburban and transit)
- 3 843 electric locomotives
- 6 223 diesel electric locomotives and multiple units
- 7 192 industrial locomotives
- 24 000 trams (light rail vehicles)
- 8 000 trolley buses
- 67 722 electric and diesel vehicles

GEC Transportation Projects Limited GEC Traction Limited

Holding Company:- The General Electric Company p.l.c. of England

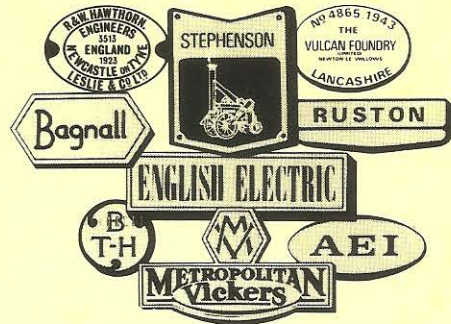
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GEC
Transportation
Projects

GEC
TRACTION

Nine faces of GEC Traction



The Glasgow Underground cars are small enough to fit inside the body of the Hong Kong Mass Transit cars.

