BRIEF TECHNICAL DESCRIPTION

APT-P is a multiple unit train made up of passenger carrying coaches and power cars with a driving trailer coach at each end containing the driving cab and some passenger seats.

APT-P normally runs at speeds up to 125mph (200 km/h) but has achieved 160mph (260 km/h) during engineering trials.

POWER CAR

Each power car has been built using lightweight steel construction and contains thyristor-controlled electric traction equipment. It develops a power of three megawatts (4000 horse power) at the rails, driving four axles. To reduce the impact and wear on the track, electric traction motors are mounted inside the body of the power car with cardan shafts driving lightweight gear-boxes to complete the final drive to each axle.

The power cars tilt round curves in the same way as the passenger vehicles, but a tilt-compensation device allows the pantograph, which collects electric current, to continue to maintain adequate contact with the overhead wire.

PASSENGER VEHICLES

The passenger vehicles include first and second class accommodation and restaurant and buffet facilities.

The internal environment of APT has been planned and designed to the highest standards and follows the trends already set in the popular InterCity 125s.

To save energy, the passenger vehicles are articulated (share their bogies with the adjacent vehicle) and are built from aluminium alloy, which gives a 40 per cent weight saving over the bodies of conventional steel coaches.

Doors into and out of the train are of the power-operated sliding-plug type, with retractable steps. Each passenger vehicle has two doors positioned diagonally, so saving vehicle length and weight.

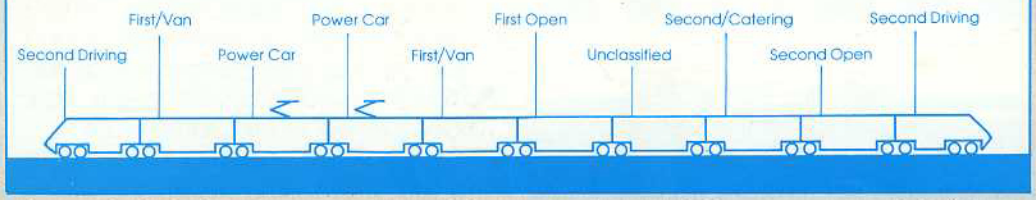
Each second class coach seats 72 passengers, and 47 seats are provided in the first class saloons.

Passenger comfort is maintained when the train is running round curves at high speed by inclining each vehicle independently by up to nine degrees inwards.

The vehicles are tilted by hydraulic jacks controlled by bogie mounted sensors. These transmit information which is processed electronically and ensure precise reaction to the characteristics of each bend.

The train is braked by hydrostatic brakes which are unique to APT. They work by churning water in a controlled manner and produce very smooth and quiet braking from very high speeds.

The actual train formation is:-



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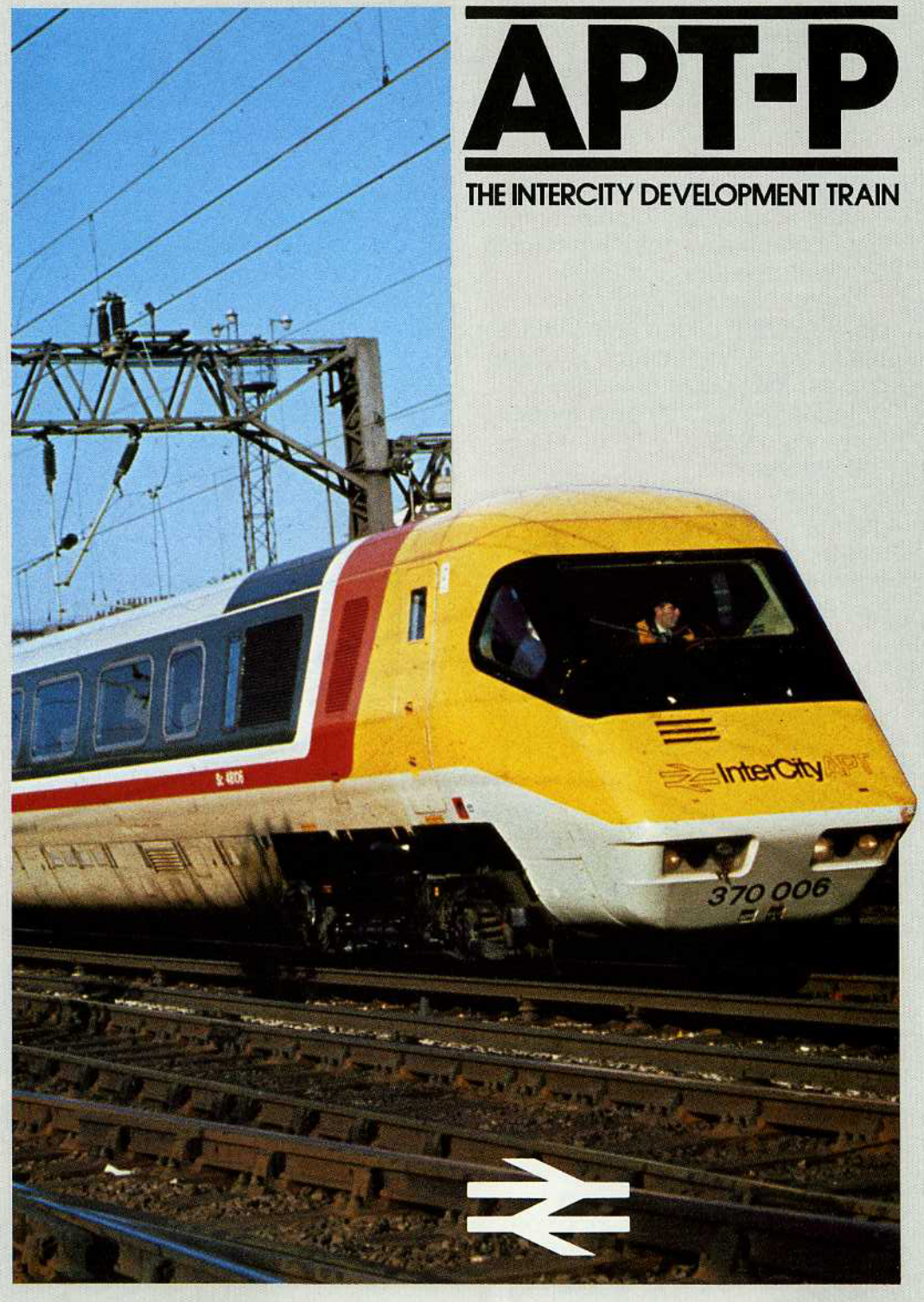
APT-P

THE INTERCITY DEVELOPMENT TRAIN



FUTURE INTERCITY TRAVEL

British Rail's future InterCity business depends upon its competitiveness and ability to offer the customer reduced journey times in fast comfortable trains which can be operated economically.

The success of the diesel powered high speed train, InterCity 125, in attracting passengers has proved this on routes where it is possible to cruise at high speeds for many miles.

However, many routes are too curved to allow steady high speed cruising with existing trains, so we need a new train which can take curves faster and still maintain full comfort for passengers.

Solving this difficult problem has required considerable work, effort and technical development. Basic laboratory research led to a full-sized experimental train paving the way to building three prototype APT-trains.

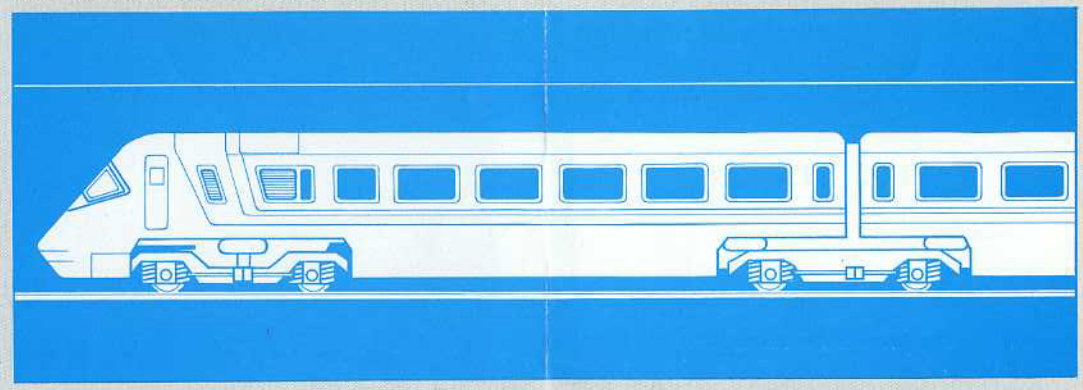
The train in which you are now travelling is made up from these prototype vehicles, built for development and ultimately to carry passengers. In practice certain features of the prototypes have not proved to be as sufficiently reliable as we had hoped, neither would the costs of modifications be economic compared with a new design.

But BR still needs the technology essential to reduce journey times on routes laid down 150 years ago. The other option – that of building a new and very straight high speed railway – simply costs too much money and would take too much land. The technology is needed because the more we can reduce journey times the more competitive we become which helps to generate new business.

We need to run this train for engineering purposes. We have to prove the endurance and reliability of the equipment and systems which make up the train by running for thousands of miles and operating for thousands of hours as a train does when in regular service.

We also need to know how passengers feel about such things as comfort, noise levels, air-conditioning and coach tilting, so that when the decisions are made about the next generation of InterCity trains we have the technology, experience, and information necessary to go the right way. The APT programme brings future high-speed trains nearer to reliable commercial service.

Your journey in APT today is a vital contribution to the future.



Some of the more frequently asked questions about the APT project are:-

Q. Why do we need advanced train technology?

A. A large proportion of BR's major routes is curved. To enable trains of conventional design go round curves and maintain adequate passenger comfort they have to slow down for many bends and accelerate away. Canting the track – raising the outer rail above the level of the inner – helps to minimise the speed reduction. By developing a train which curves faster and still keep passengers comfortable, we save time and fuel enabling BR to sell shorter journey times and keep costs down.

Q. How does APT achieve this?

A. APT can take curves between 20 to 40% faster than conventional trains by tilting the coach bodies exactly the right amount to keep the passengers comfortable when running through curves. It also has a suspension design which combines stable running and good riding with low track wear.

Q. Why did APT take so long?

A. It took seven years to complete a programme of fundamental research which included the building and testing of an experimental train – APT(E). Many new components and systems had to be designed, tested and modified. Since then prototype vehicles have been built, tested, modified and adapted – all during a time of resource shortages.

Q. How much has it cost?

A. About £3m a year since the Project began, during which time much of the technology developed has been incorporated in other train projects from local commuter trains to the InterCity 125s.

Q. Is a new generation of high-speed trains still required?

A. APT-P was originally conceived to operate at speeds up to 155mph on the West Coast Main Line with tilting coaches. This had important effects upon the design solution adopted. The latest InterCity strategy confirms that the benefits of reduced journey times are still justified commercially, but recent analysis shows that speeds as high as 155mph are no longer commercially viable on either the West or East Coast Main Lines. From a financial point-of-view the best option now appears to be a locomotive hauling tilting coaches at a maximum speed in the ranges 125-140mph, thereby avoiding some of the stringent technical requirements for APT-P. This could still be used for other services, including slower overnight trains. On the West Coast Main Line a new locomotive would be able to exploit the potential of a new design of tilting coach, which will offer attractive reductions in journey time. Considerable development work has already been completed on the tilt system to improve performance and reliability and to enhance ride quality. Further important development work to complete the programme still remains to be done and APT provides the essential test bed for this work.