international news

Steel on steel for British rail

John Wilson

BRITISH RAIL (BR) will use steel wheels on steel rails to drive and support inter-city passenger trains of the 1980s, travelling at speeds up to 300 km h^{-1} (188 mph). Mr Mike Newman, in charge of BR's Advanced Passenger Train (APT) project, says that no existing linear motor can compete with present conventional electric units in efficiency and believes that the development of a magnetic suspension system with its costly new track is unnecessary for this sort of speed. His opinion conflicts with that of the Commission of the European Communities which recently invited manufacturers of high-power linear motors to Brussels to discuss cooperation in the development of just such a magnetically suspended, linear-motor driven system.

An experimental APT has already started a three year development programme by travelling at 200 km h^{-1} (125 mph) on a test track near the Derby works. This experimental train consists of a power car at each end separated by two trailer cars only, but commercial versions should propel about seven trailer cars. The whole articulated unit is highly streamlined and has a very low cross sectional area, roughly that of Concorde. The final versions will be built as very light semi-monocoque stress skin structures, a technique borrowed from the aircraft industry, and indeed the whole unit resembles an aircraft rather than a train in the design of the interior equipment and accessory systems.

The experimental APT is powered by conventional gas turbines, for the success of the British APT lies not in any revolutionary power plant but in its novel suspension system. Dynamicists at the Railway Technical Centre in Derby were the first to work out the complex mathematics of the ordinary railway wheelset (two flanged wheels rigidly attached to a live axle). They discovered that by altering the cone angles and tyre profiles of the wheels they could make the set roll with a minimum of oscillation. This allows the APT to be run at speeds of up to 250 km h^{-1} (155 mph.) even on existing track and to negotiate main line curves

British Rail's APT: running on the same lines into the eighties

50% faster than conventional trains.

Greater speeds than these are possible with APT variants using more powerful engines, but considerable modification of the track is necessary. Mr Newman notes, however, that any improvement made in the track for the benefit of the APT would also benefit normal services. This is in contrast to other methods of high-speed travel where the new track is for the exclusive use of the new vehicle.

The keynote for BR's plans for the new train is the utilisation of existing assets. The brakes, for example provide double the usual performance expected for a normal train—and this in a vehicle of less than half the normal weight. For this reason the early APT's due to begin a trial service on the (London to Glasgow) West Coast main line in 1978 should be compatible with existing signalling equipment. Mr. Newman points out that by improving the track alone electric trains already in service could almost match the performance of the APTs. On a route such as London to Glasgow, which an APT with a speed of 250 km h^{-1} (155 mph) could travel in 3 hours 47 min, a conventional train could take as little as 3 hours 50 min—if all the necessary track improvements were made. Although it is worth noting that the APT could then chop another 37 minutes off this new improved route, the point is that these comprehensive track improvements would cost up to ten times more than an APT system.

The APT is an attempt to stretch an essentially Victorian railway system using 1960s technology. Any successor to the APT will have to be a completely new system. This is because the introduction of APTs is expected not only to compete more effectively with motor-

ways and airlines but also to generate considerable trade itself—to the point, in fact, where the system becomes saturated. It is this saturation, expected about the 1980's, not the need for higher speed, which will lead to the necessity to construct new track, and it is at this point that systems using linear motors, hovertrains and the rest begin to seem attractive.

Cancer research runs into trouble

Colin Norman, Washington

A COMMITTEE of biomedical scientists has delivered a stinging attack on a prominent and highly controversial cancer research programme supported by the US National Cancer Institute. The committee's criticisms and complaints cut deep into the philosophy underlying much of the loudly proclaimed federal war on cancer. Because they raise the basic objection that cancer research shouldn't be targeted and managed like a NASA-style operation to land men on the moon.

The research programme in question, the Virus-Cancer Program (which used to be called the Special Virus Cancer Program) is the epitome of the highly managed, centrally directed approach to cancer research. It now disburses more than 40 million dollars a year, entirely in contracts, to universities and industry for studies on cancer viruses and for the development of resources to support such research.

Ever since it was started ten years ago, with the specific approval of Congress, the Virus-Cancer Program (VCP) has been attacked for a variety of sins, chief of which is that it has been directed by a few people who have