Trams are now big business

by Basil Silcove*

Transport developments — whether on land, at sea or in the air — are seldom out of the headlines. Around the world, the trend is towards bigger, faster and more complex vehicles, ships and aircraft. Transport technology and operations today are shaping everyone's uture — whether we might wish it or not. In the past six years or so, the overriding concern has been to tevelop forms of transport that are likely to conserve our diminishing oil supplies and more importantly cause the minimum damage to the environment.

In the United States, when the Cleveland, Ohio Regional Transport Authority recently called for tenders for its first new trams for 30 years there were no fewer than 19 bids from five countries. This unprecedented competition for a comparatively small order of 48 "walk-through" articulated units, valued at \$31 million, for the city's prestigious Shaker Heights routes vividly illustrates the upsurge in interest in light rapid transit (LRT)—the intermediate mode between bus and metro.

More and more cities in Europe, North and South America, Africa and Asia are realizing that they cannot afford the massive construction costs of a heavy metro, yet need something more flexible, attractive and acceptable than the street-bound and relatively slow diesel bus, which relies on the uncertain future of hydrocarbon products. Fortunately, the modern tramway, now termed ight rapid transit, has never lost its development momenum. A wealth of experience and proven products over many years is ready to meet the new challenge. Not surprisingly the largest number of such manufacturers, with their constantly updated technology, is in Europe, he postwar heart of LRT progress.

Formation of light rail commission

The 1973 oil crisis, coupled with the escalating cost of heavy rail construction, has given urban light rail ransport even greater impetus. The International Union of Public Transport (UITP) centred in Brussels, at a meeting in Madrid in April 1976, first discussed the setting up of a separate body divorced from, but linked through membership with, the Metropolitan Railways Committee. It its March 1977 meeting in Zurich the UITP president irged early action on LRT as a top priority on a cost-effective basis. Then, in October 1977, the working party net for the first time in Stuttgart, West Germany. It was composed of members who already operated light rail systems or intended to update their tramway systems to ight rail systems.

The newly formed International Light Rail Commission LRC) met for the first time in Brussels on March 14-15, 978. All 18 participants agreed that the problems of ght rail systems could be dealt with only by a separate.

fully active body. An attempt was made to find an internationally standardized name for light rail. Hitherto eight different names in various countries had been used, but after prolonged discussion it was finally agreed that only the terms "Stadtbahn" in German, "Metro Leger" in French and "Light Rail" in English should be used internationally.

The new commission cencerned itself from the very first with the definition of the term light rail and it was agreed that light rail must cover all forms of rail-borne urban transport other than metropolitan railways. The 13 original countries are: Australia, Austria, Belgium, Canada, Finland, France, Italy, Sweden, Switzerland, The Netherlands, United States, West Germany and Yugoslavia.

Criteria to be investigated

The ILR commission agreed that light rail, as a vital city transport system for the future, must be investigated according to its criteria — all details not specific to light rail being discarded. Then the results of the work are to be summarized in internationally valid recommendations in the UITP Revue. The following criteria are to be investigated in the 1980s: separation of the different types of traffic; horizontal and vertical separation—traffic, town planning and economic considerations. Degree of development: tunnel, viaduct, own right-of-way, crossings and their safety, stopping places, vehicle platform height, waiting rooms, information, terminal facilities, power supply, train protection equipment and protection against noise.

Type of vehicle: articulated, twin set, single or double-ended, length and width, number of axles and distance between bogie centre pins. Boarding and alighting: number and width of doors, height of steps and retractability. Technical equipment: control, drive and braking systems. Operation: marking lines or trackside border stones, prohibition of left (or right) turns, prohibition of certain streets for motor cars, correct position of stopping places, pedestrian zones. Traffic control measures: synchronized road traffic signals in favour of rail operation, computerized operating control, radio link from traffic control centre to vehicles. Fares: easily understandable tariffs, limitation of tickets in vehicles, fixed or mobile issuing and cancelling machines.

Austria

Two Austrian manufacturers have thrived on the needs of Vienna, which has one of the world's most extensive tramways, as well as the smaller systems of Graz, Linz and Innsbruck. Simmering-Graz-Pauker (SGP) has a firm

Mr Silcove is a Melbourne transport writer, and a member of the Light Rail Transit Association, London.

base as railway equipment supplier. The smaller Lohnerwerke, relying mainly on tramcar building, has been guaranteed a bright future by a recent takeover by the Canadian firm of Bombardier-Rotax, a snowmobile manufacturer now busy diversifying into the transit field and keen to acquire European know-how. Both firms are sharing the development of a new type six-axle light rail vehicle (LRV) at present entering service in Vienna as a single-ended car for tramway use and a double-ended car for the modernization of the "Stadtbahn" — the world's pioneer example.

۸.

Australia

Adelaide has had a light rail line since 1929 with a high-speed tram to Glenelg beach, and recently it was planned to join it to a planned new route to Tea Tree Gully, in the north-east suburbs. This would have given a 26 km through service to serve the city centre, railway station and Adelaide Oval, and would have been operated with modern articulated units — the first in Australia. But with the recent change of government in South Australia, this energy-conserving scheme was scrapped, leaving only polluting private vehicles and the slower diesel bus to carry the traffic to and from this developing area.

In Melbourne, the 3.4 km East Burwood extension, which opened in 1978, is built to the highest light rail standards and boasts an average speed of 25 km/h even at peak periods. Express lines of this calibre are needed in many Australian cities. The order for 115 new orange trams (Z1-2) has been completed and delivery of 100 Burmese gold (Z3) trams, incorporating German technology and chassis improvements by the builders, Commonwealth Engineering (Vic) Pty Ltd, of Dandenong, is now taking place.

The Victorian Government's 1979-83 plan for Melbourne tramways calls for: replacement of all veteran stock by 28 new trams a year; traffic signal priority at crossings; doubling of present length of tram track separation by the use of reservations, kerbing, double-yellow lines, underpasses, etc. to lift average speed and to avoid unnecessary hold-ups to tram passengers; extension of the East Preston tram route by 5.6 km to Bundoora to cater for LaTrobe University, several hospitals and housing areas.

Campbelltown, 50 km south-west of Sydney, has made known a plan for a light rail line to link suburbs with a new shopping centre and railway station. This may well be the forerunner of others in this country. In Sydney itself, there is a possibility that the newly opened Bondi Junction underground terminal could be linked to the eastern beaches by some economical feeder light rail lines.

Belgium

When the President's Conference Committee (PCC) produced their revolutionary design for a standard United States tram in the mid 1930s, they little dreamt that 45 years later new PCC cars would still be under construction, albeit on another continent. West European licensee for the PCC vehicle was La Brugeoise et Nivelles, of Bruges, in collaboration with Westinghouse subsidiary ACEC, of Charleroi. The main market for their products has been in Benelux and France and the latest development is an eight-axle double-ended LRV for Brussels. The Belgian industry is actively seeking new export markets and, with an order from Rio de Janeiro under its belt, is now undertaking promotional work in North America.

Canada

There is no better example of the swing back to trarnways in the form of LRT than Canada. The number of undertakings will have tripled in the period 1978–81 with new systems built in Edmonton and Calgary joining Toronto's thriving and efficient operation, which is currently constructing a 7 km express tramway to Scarborough town centre. Canadian transit car builder Hawker-Siddeley was awarded the contract to build a new fleet of 190 new bogie cars for Toronto in a plant that assembled some of North America's PCC cars in 1949. The design is being marketed in the export field by the government-sponsored Urban Transit Development Corporation, which originated in Ontario in 1973 and now serves ail provinces in the Dominion.

Czechoslovakia

Just as La Brugeoise became the West European licensee for the North American PCC car, so Vagonka Tatra Smichov of Prague became the licensee for Eastern Europe. In terms of volume production Tatra now leads the world with 1,000 cars a year rolling off the production lines. Designated supplier of trams to the transit-hungry CCMECON countries, Tatra has made major improvements to the PCC design and now offers a standardized range of four, six and eight-axle cars, single or double ended, and with a choice of control systems, including thyristor chopper electronics. Export potential has until now been hampered by production restraints of the century-old plant. But the opening of a huge new factory is imminent and this will boost light rail orders by up to 50 per cent.

France

LRT is now the government-preferred option for segregated transit in medium size cities, and the 1980s are likely to see a great tramway revival in at least 12 cities. A national competition for LRV design led to Matra (in collaboration with La Brugeoise) and Alsthom being designated approved suppliers of the LRVs that will be needed in quantity.

Germany

Inspired official attitudes to public transport have produced a healthy home market to support West Germany's LRV builders who are now scoring some notable successes in the export field. Market leaders are Waggonfabrik Uerdingen of Dusseldorf (Duwag), pioneers of the high capacity LRV that has proved so economically attractive. Duwag also is supplying essential parts for Melbourne's new Z3 trams. Current Duwag designs are anything but standardized (although conforming to certain overall norms laid down by the operators' association) since generous funding permits light rail systems to specify one-off features to suit individual operations.

Other builders such as Linke-Hofmann-Busch, Waggon Union (Berlin), Wegmann and MAN have survived to meet demands for production in local plants, backed by other activities in the rolling stock field. Although conventional street trams are still offered, production is concentrating on "Stadtbahn" designs, with higher performance and folding steps for operation in a variety of modes-street, reservation and subway. German LRV technology has been sold to many countries: Australia, Austria, Britain, Canada, Finland, Italy, The Netherlands, Norway, Switzerland and Yugoslavia, with the car builders backed by a host of specialist firms offering a complete LRT package.

Great Britain

Severe constraints on public expenditure mean that of several LRT schemes planned in recent years for industrial cities like Sheffield, Leeds, Bristol and Manchester, only the Tyne and Wear semi-metro, based on the Newcastle area, has been built. The first part of this 54 km network is due to open this year with the balance by 1982. Not surprisingly, Birmingham car builders Metro-Cammell have drawn considerably on German know-how in the construction of 90 articulated units which will be used, and are actively seeking export orders in the transit field. Modest progress has been made with tramway modernization at Blackpool, one of England's busier resorts, but light rail plans in other cities will not come to fruition without a radical change in government policy towards pollution-free and noise-free public transport.

Hong Kong

The heavily used tramway on Victoria Island is to be substantially upgraded, involving during the next few years, a big order for the continental-type articulated unit. Proposals for a new light rail system on the Kowloon mainland are now being evaluated.

Brazil

Many studies into proposals for new light rail install lations are under way in energy-conscious Brazil. In Ris de Janeiro, the first LRT line, a feeder to the new metro is scheduled to open this year.

Finland

Helsinki is building a metro to link the city with outer suburbs across its waterways, but the tramway system serving the central areas and suburbs to the north and west, is being modernized and extended.

Italy

The oil crisis gave Italy a particularly severe jolt. Office ial interest in the existing tramway systems has increased although the country's desperate financial situation has limited action to refurbishing work rather than new in vestment. However, Milan has managed to push through an order for 100 "jumbo" articulated trams, and the design is now on the world market through a consortium of builders and equipment suppliers.

Japan

The enormous traffic flows in the biggest cities have prompted metro construction. In other cities of up to million or so inhabitants, it is planned to replace the existing rolling stock by several hundred articulated trame within the next few years.

The Netherlands

The enormous cost and disruption of metro construction has resulted in a nationwide decision to abandon further expansion of this mode in favour of light rail, to Amsterdam, the street tramway system has been progressively segregated and expanded, and the fleet now comprises only eight-axle articulated cars. Several new light rail lines have been approved for construction in the immediate future. Expansion of the metro will cease when the existing line is completed to the central station. The Hague has been progressively upgrading its tramway system to semi-metro standards; new lines have been built and others are planned. The present fleet of modern high-performance trams is being enhanced by the delivery of the first articulated cars. Rotterdam has a modern tramway system with many segregated lines, and a second metro is being completed to light rail standards. In Utrecht, the country's fourth city, a brand-new light rail line with two branches is being built to link the city with new housing areas to the south. Light rail was the chosen mode instead of a conventional railway branch,

sweden?

Gothenburg has one of the most modern light rail systems in Europe — as much as 72 per cent of its network is fully segregated from other traffic; another 13 per cent is operated in reserved lanes. A recent study concluded that to replace the tramways with buses would increase operating costs by 80 per cent. Design of a new generation of rolling stock has begun and extensions to the system are being built. In Norrkoping, two crosstown tram routes have been retained and modernized and a further extension is being built. Stockholm retains light rail as a metro feeder mode; including the line to Lidingo.

Tunisia

Tunis has decided on the construction of a 30 km light rail system to handle city traffic and the government has accepted the offer from a German-French consortium to build the network. It is anticipated that 78 eight-axle chopper-controlled light rail vehicles will be built as the first stage.

Philippines

A contract has been placed with a Belgian consortium for the construction and equipment of a 24 km light rail system. The first 16 km will link Manila with its airport. La Brugecise/ACEC will build 64 articulated cars at a cost of \$96 million.

Switzerland

Hydro-electric power is the basis for Switzerland's reliance on electric traction for public transport. Country-wide there are a host of light rail interurban lines as well as urban systems in six cities. Basle has recently added another 66 articulated cars to its fleet and 39 are on order. Berne has completed the modernization of its tramway system. In Geneva the one light rail line carries a third of all city passengers and is soon to be modernized with new rolling stock. Neuchatel has ordered new vehicles for its light rail line. In Zurich, a recent referendum rejected a metro and approved the completion of some sections already under construction as extensions to the modern tramway system. Rolling stock to service the enlarged system will reach 220 articulated units by the mid 1980s.

Yugoslavia

The four Yugoslav tramways have all been extensively modernized recently and delivery of the latest vehicles continues. The Belgrade tram network is expected to be enlarged by about 50 per cent in the next few years. Sarajevo has replaced its narrow-gauge outmoded local tramway with a standard gauge extended light rail line,

serviced by 40 articulated Czech trams.

United States

It is ironic that a country with such a vast rapid transit heritage should have gone through the traumas of recent years in its attempts to get "back on the rails". After a decade or two of neglect, rapid transit was rediscovered at a time when the established builders were fast fading from the scene, and the aerospace companies were casting around for new markets to take up their spare capacity.

Overdesign and often wilful blindness to proven technology by companies with no experience in rail transit provoked a disaster that brought many firms to the verge of ruin. Fortunately there are now indications that attitudes are changing and European experience is being brought in to help. The Boeing standard LRV was manufactured in the mid 1970s in a plant at Philadelphia where helicopters for Vietnam were once made.

San Francisco took delivery of 100 Boeing-Vertol six-axle articulated cars. Of Boston's order for 175 similar cars, only 140 were finally accepted. The remaining 35 units were cancelled and Boeing have agreed to repay Boston \$40 million of the contract price as well as a payment of \$22 million for modifications to the cars already delivered.

Transit officials from Boston. Buffalo, Denver, Detroit, Newark. Pittsburgh and Portland recently met to consider the specification for a new standard light rail car for the United States that would avoid the problems encountered with the Boeing standard LRV. A joint order for some 300–400 cars is a possibility and talks have already been held with seven manufacturers.

Light rail has attracted widespread attention in the US as an alternative to expensive metro construction for cities wishing to revitalize their urban public transport systems. Studies are under way for new systems and construction already has started in Buffalo (New York) and San Diego (California). All existing networks are being modernized with new rolling stock. Cleveland has placed an order for articulated cars with an Italian builder while Philadelphia has gone to Japan for 141 bogie cars to be assembled locally. Other orders have gone to Germany.

USSR

The Soviet Union leads the world in the number of operating tramway systems. Official policy encourages electric traction for urban centres, but the limited number of existing or proposed metro lines receives much more publicity than the huge scale of tramway (and

continued on page 16

opened the way for many smaller companies to get into the industry and, where successful, reap the rewards. The development of the consortium system has also helped smaller companies move more readily in the industry by allowing both the cost of exploration and drilling, and the "risks" inherent in the business, to be spread over a larger number of companies holding small interests in nevertheless what could prove to be highly lucrative oil and gas acreage.

Excitement in the market

In fact, much of the excitement in the share market, both in Australia and overseas, has centred around these smaller, more speculative companies with oil acreage that one day — given luck and sound exploration expertise — could make them into very large companies indeed. The interest in oil has also prompted new companies and some old companies with new names to move into the business. Such names as Strata (now with a good gas strike under its belt in Western Australia), Canada North West, Moonie, and the soon-to-be-listed Pancontinental Oil (an offshoot of the successful uranium explorer of the same name) are all new to Australian share markets and have attracted tremendous investor interest and support.

In the immediate future, the interest is likely to grow among the wide range of oil and gas exploration hopefuls listed on local markets. This will tempt many investors, if they are not already, into the market for oil and gas shares. The potential there looks bright, but it is worth keeping several important points in mind. First, the success ratio in oil and gas exploration is not high and many companies will eventually fall by the wayside, having drilled and tried hard, but eventually finding their hopes unfulfilled. Others will be tremendously successful, as some have been already.

Second, the high risk factor in oil and gas exploration means that shares can fall far more rapidly than they have risen, and they have to be watched carefully. Third, the market for oil and gas shares is highly volatile and investors have to be prepared to suffer violent price swings both up and down as drilling and other exploration results emerge. The danger of course is that one such swing may mean nothing and the shares at a later date could resume their old course; on the other hand it could mean the end — the real end — of any share market move.

Fourth, Australia is not really regarded as highly prospective to oil and gas, a fact that has been borne out by previous, though limited, exploration. Certainly a large part of the continent's sedimentary basins are potentially hydrocarbon bearing, but the chances of locating large reserves are regarded as very slim. But this is where the

smaller companies come in. Updated seismic studies have shown there is substantial potential for smaller finds in many areas of Australia, and this is where the small explorers are concentrating their efforts. A study of the programmes by potential investors could prove to be rewarding.

Trams are now big business

continued from page 9

trolley bus) operation. Tram subways are being planned for Minsk, Volgograd and Yerevan. It is reported that nine other cities are to have rapid tramways. A new tramway links Naberezhnye Chelnye, in Siberia, with the Kama River truck opened by the US truck firm Mack in 1973.

The Soviet requirement for new trams is the world's highest, with the 110 systems generating a demand for about 1,500 new cars each year. Of these, about 500-600 are imported from Czechoslovakia, with production of the remainder split between the Riga (Latvia) works and the Kirov factory at Ust-Katavsk, east of the Urals. All new stock comprises high-capacity bogie cars of rather basic designs but the inability to satisfy home demand means that, so far, there is little export potential.

South Africa

When urban transport expert Albert Meier, who is the Light Rail Transit Association's vice-president and a former Zurich tram chief, was holidaying in South Africa, he probably didn't realize what he had started. Giving an illustrated lecture in Johannesburg on Europe's modern tramway development, his stimulating words did not fall on deaf ears. Local research soon got under way and recently the city council sent a deputation overseas on a fact-finding tour. It is now acknowledged that a light rail system, based on a north-south axis, is not only badly needed, but feasible.

Future assured

With the world's attention focusing more and more on economical means of transport, light rail with its benefits of speed, independence of hydrocarbon fuel and pollution free operation looms as the urban transport medium of the future. Fortunately it is a medium with a past as well as a future, and there is a wealth of experience and technical expertise on LRT in many countries around the world. The recent formation of an international body will assist in disseminating this knowledge and give further impetus to the development of this vital transport medium.