31 May, 2007

The Executive Officer
Rural and Regional Committee
Parliament House
MELBOURNE VIC 3002

Dear Members of the Rural & Regional Committee,

SUBMISSION TO THE INQUIRY INTO RURAL AND REGIONAL TOURISM

I have much pleasure in making this submission to the inquiry on behalf of my company and as an interested citizen with a personal interest in the long term growth of sustainable tourism in rural and regional areas of Victoria.

My wife, Julia, and I have well advanced plans to establish and operate a new purpose-built top quality “five star” Bed & Breakfast Boutique Accommodation business with our company at Foster North in the Prom Country region of South Gippsland and hence declare our great interest in encouraging and assisting the growth of high yield sustainable tourism in South Gippsland, in particular, and the increase in both international and domestic visitor nights in this region and other rural and regional areas of Victoria in the future.

In the following pages of this submission, I shall address the following Terms of Reference of this inquiry:

(1) the economic benefits of tourism in regional areas, including tracking the flow-on benefits through other regional businesses and industry;
(2) potential impediments to the sustained growth of regional tourism, economic activity and jobs;
(3) the effectiveness, at a National, State and local level, of current programs to promote and enhance tourism in regional Victoria;
(4) initiatives to increase both international and domestic visitor nights in regional Victoria;
(5) the efficacy of existing mechanisms at a National, State and local level to address the impact on regional tourism of natural events such as bushfires, floods and drought, and effective measures to drive long term economic recovery; and
(6) opportunities to leverage private investment and commercial activity in regional tourism infrastructure, including ecotourism.

I am particularly interested in your thoughts on my suggestion concerning the development and location of Melbourne’s second international and third domestic airport at or near Tooradin on Westernport Bay, along with an extension of the train line from Cranbourne to link to it. An additional rail link (as an alternative to the proposed VFT project) could be considered to link the proposed airport to the Mornington Peninsula too, with the line to roughly follow the route of the Baxter/Tooradin road, and connect to the Frankston line. I believe that this would not contravene the conditions of the Tollway contract with Transurban, which I understand prohibits the government from connecting Tullamarine Airport with a rail link to the city. Avalon airport is impossible to reach when the Westgate Freeway is blocked following a road accident or due to road works, with no
alternative routes available from the city. This disadvantage would be overcome by an airport at Tooradin, especially with a rail link back up in case of emergencies.

In this regard, I am pleased to attach (as Appendix 6) some images of a proposed new airport for Sri Lanka’s south coast town of Hambantota, which was lashed by the recent Boxing Day Tsunami. It is a small country’s far-sighted proposal for Sri Lanka’s second international airport, designed to encourage and develop tourism and commerce and is an ideal model as an example of what we could achieve in Victoria, for your consideration under my proposal as part of the development of a vision for the future of sustained growth of regional tourism (to increase both international and domestic visitor nights in regional Victoria), economic activity and jobs in Victoria, with a view to maximising its vast tourism potential, which I believe is the future driver of business for Victoria and Australia. I shall be pleased to e-mail copies of the images (in colour) in the Appendix for your Committee, if required.

I request that you please seriously consider this submission and look forward to receiving a copy of your final report.

Thanks and regards,

Yours sincerely,

ROGER F. ALDONS
Managing Director
(1) The economic benefits of tourism in regional areas, including tracking the flow-on benefits through other regional businesses and industry

a) It is important to recognise and take full advantage of the growing value of Victoria’s (and Australia’s) unique natural assets in attracting increasing numbers of domestic and international visitors to this state and in enhancing and growing Victorian tourism income, jobs and the economy at a time when many businesses in manufacturing industries are increasingly investing and moving their manufacturing operations offshore.

b) Increasing tourism development through a big picture vision for Victoria looking years ahead into the future can soften and offset the economic impact of the loss of manufacturing operations overseas, decline in farm incomes and can generate new local manufacturing opportunities and service businesses to service the new tourism businesses as they develop around our major natural assets, particularly in rural and regional areas, thereby creating new job opportunities, decentralisation, sustainable economic growth and increases in employment. This is especially important for revitalising rural and regional areas that have seen reductions in their populations, decreased employment opportunities for their young people and a general decline in local economies, rates income, outdated local infrastructure, transport and health services, community enthusiasm and the once vibrant country ‘spirit’ of many of our rural and regional communities, due to a variety of causes over recent years, including funding cuts by State Governments, planning changes, floods, bushfires, drought, etc.

c) Rural and regional communities, including local chambers of commerce and industry, need to be educated through public forums, with the assistance of State and Local Government funding, on the economic benefits of tourism and its value to their communities through flow-on benefits such as local infrastructure improvements and investments, increased arts and cultural events and funding, education and hospitality training opportunities, health services improvements, the creation of new, increased business and employment opportunities for local businesses in ecotourism, food and wine / agri-tourism (e.g. farm gate sales, winery cellar door sales), manufacturing, trades and services, generated by the increase in visitor numbers and visitor nights, especially high yield domestic and international visitors on middle to high incomes, to encourage their enthusiastic support for increasing local tourism. It is essential that each local community within a region understands the economic benefits increased tourism offers their community as a whole, so that the whole community shares the responsibility and enthusiastically supports every endeavour by their local tourism bodies and Shire Councils to improve tourism in their region in a co-operative, harmonious and friendly atmosphere which is vital for success.

d) The State and Federal Governments should establish hospitality training facilities at TAFE colleges within each of Tourism Victoria’s tourism regions so that local young people may be encouraged to pursue tourism and hospitality training within their ‘home’ region with the support of local tourism and other businesses for work experience opportunities and in order to create a pool of talented young people with appropriate hospitality service skills which local businesses could draw from for employment of new staff. For example, food catering for some local tourism events could be undertaken and served by hospitality trainees from local TAFE colleges who could also provide catering and other hospitality services to local accommodation businesses, local wineries, etc, as required.
e) Many 'Baby Boomers' and older Australians in increasing numbers are seeking tree- and sea-
changes in rural and regional tourism areas for their retirement and to improve their lifestyles.
This phenomenon will generate increased numbers of domestic and international visitors to
these regions with family and friends visiting their elderly relatives. However, there will also
be a consequent increase in demand for accommodation facilities, retirement villages, health
and aged care services and employment of skilled workers in these healthcare fields within
these regions. There will be a growing need for more local training facilities for people in the
region to be trained in skills to meet these additional service requirements within their local
communities. Funding and TAFE college facilities must therefore be provided by State and
Federal Governments, as above, within each rural and regional tourism region to meet these
growing needs of the future and to encourage local people to stay and work in their 'home'
region where they grew up, thereby developing and growing their local community and the
economic benefits for the region.

f) More hospitals and nursing homes will be needed in rural and regional tourism areas to meet
the needs of the aging populations and increased visitor numbers in the future. Major teaching
hospitals with advanced, state of the art specialist treatment facilities should be established in
the major towns within each tourism region, so that local people may be encouraged to train
in their own region in the health professions, and so that people living and working in these
regions need not have to travel, at great expense (considering rising fuel prices) and
inconvenience to Melbourne and/or their regional capital city for specialist treatment and
procurement of quality health services. It would be appropriate for these regional teaching
hospitals to be used to reduce treatment waiting lists and relieve the pressure and congestion
in the Melbourne hospitals and specialist treatment centres by also encouraging Melbourne
residents to visit the regional centres for earlier treatment than would be possible in
Melbourne.
(2) Potential impediments to the sustained growth of regional tourism, economic activity and jobs

a) Most of Victoria’s (and Australia’s) major rural and regional tourism destinations are located great distances apart and several hours drive away from Melbourne. As many international visitors have only a limited period of time to spend in Australia and Victoria when they visit, and domestic visitors similarly are trending towards several short breaks rather than long annual holidays, the rising fuel prices and lack of fast, convenient and economical public transport access from Melbourne to, and between Victoria’s major tourism destinations, is a potential impediment to sustained tourism, economic activity and jobs growth in regional areas and a disincentive for teaching staff, medical specialists and other healthcare providers to relocate from Melbourne to regional tourism areas, where there is a great and growing need for their services as discussed above.

b) Much of the travel by road between Victoria’s major rural and regional tourism areas is time consuming, boring and tiresome, with a sameness of dreary scenery over the long distances and travelling times involved. For example, travelling from Melbourne to the West coast and the beginning of our beautiful Great Ocean Road – one of Victoria’s most famous tourism icons – is a very tedious trip of over two hours before one even sets eyes on the sea, with some of the most boring stretches of scenery any international or domestic visitor could experience along the way, including rail yards, car yards, industrial complexes, untidy machinery yards, etc! Many of our overseas guests have asked, during this monotonous journey, how long it will be before we reach the Great Ocean Road! A very fast Maglev or TGV train (VFT) service linking Melbourne and Victoria’s main rural and regional tourism destinations with one another would be an ideal and visionary long-term infrastructure solution to overcoming this impediment to the sustained growth of regional tourism, economic activity and employment, especially if this suggested train service facilitates tourists being able to transport their cars on such the train to enable them to undertake local tours of the regional destination. The establishment of such a very fast train service, together with careful town planning would see the rapid growth of satellite townships at the major rural and regional tourism destinations and employment growth through retail and other service businesses such as car and bicycle hire firms, etc. Professionals such as doctors, nurses and allied healthcare workers would be encouraged to settle in regional areas which offer better lifestyles because of their ability to work in those regions as well as in Melbourne, with very quick, convenient commuter transport possible between the regions and Melbourne on the proposed VFT. Tourists will be able to travel rapidly to and between our major tourism destinations in the regions with minimal time wasted on boring travel, while being able to spend their valuable tourism dollars in the regions on food, entertainment and sightseeing, for the benefit of regional economies. Significant reductions in greenhouse gas emissions would be possible if the proposed very fast Maglev (or TGV) rail option is built and powered largely by electricity generated from renewable energy sources, with travellers opting to transport their cars for local use in touring at tourism destinations or actually hiring cars locally at the destinations serviced by the very fast train.

c) Melbourne’s second international and third domestic airport needs to be constructed in a convenient location serviced by public transport and close to Melbourne’s demographic centre to facilitate the growth of sustainable tourism in the regions and for the convenience of Melbourne and Victoria’s travelling population, as well as interstate and international visitors. The location of Melbourne’s second domestic airport at Avalon in the West is an impediment to regional tourism in the state, because of its considerable distance from
Melbourne’s demographic centre and the very inconvenient access from Melbourne along a single busy route, which involves long travelling times from Melbourne’s demographic centre and a high risk of missing flights should there be traffic congestion or an accident on the Westgate Freeway – the only access route to Avalon Airport from Melbourne.

d) Natural disaster such as bushfires, floods or drought also impede the sustained growth of regional tourism, economic activity and jobs in the regions, because of the potentially catastrophic consequences of such events which often involve businesses and investors in the regions going to ruin and losing their livelihoods, in the absence of any form of blanket consequential loss insurance cover to protect tourism and other businesses in the regions from devastation as a consequence of loss of revenue following such events. There is a great need for tourism and other businesses in the regions to be given some long term certainty and security over their investments and entrepreneurial skills. This may be achieved by the State and Federal Governments, local and international insurers and local stakeholders in the regions through their local tourism associations and/or Councils contributing towards a blanket compulsory insurance cover under a Tourism Master Policy to protect the businesses and communities in the regions against losses of revenue consequent upon natural disasters including bushfires, floods, drought (in excess of a nominated minimum period) and earthquake.

e) Unregistered, backyard, unauthorised, unprofessional, sub-standard and “cowboy” type accommodation and tourism service providers should not be tolerated or allowed to operate, as they can tarnish the image of regional tourism and be a great impediment to the growth of regional tourism, economic activity and employment.

f) The lack of funds available within some local tourism associations and Shire Councils in regional tourism areas, where there are relatively small populations, low incomes from council rates and large geographical areas under the administration of such local councils is an impediment to the growth of regional tourism without significant financial assistance with funding by State and Federal Governments to subsidise those councils to improve local infrastructure, amenities, promote tourism, arts and cultural events in their regions in order to encourage more visitors and facilitate sustainable growth in regional tourism, economic activity and jobs.

g) The lack of a natural gas reticulation network and supply throughout most of rural and regional Victoria to service the energy needs of tourism businesses in rural and regional Victoria is an impediment to tourism in those areas due to bottled LPG being far more expensive and labour intensive to service, with no subsidies or concessions to property owners unlike those enjoyed by residents and business operators in Melbourne and its suburbs.

h) Frequent power failures in Rural and regional Victoria are another impediment, with tourism accommodation providers and other businesses having to expend extra money on generators in order to have certainty of some supply in periods of power blackouts in order to service the needs of visitors. It would appear that this impediment could be resolved or improved by power infrastructure at substations being modernised and updated and power lines being placed underground, especially when being replaced after bushfires and storms, when fallen trees and branches are a frequent cause of damage to overhead powerlines and consequent power failures.

i) Inadequate tourism promotion and advertising to lift the awareness of these tourism destinations with significant natural tourism assets, through lack of funding by Shire Councils who have very limited incomes from rates revenue due to low population numbers but large geographical areas to be administered is a major impediment.
(3) The effectiveness, at a National, State and local level, of current programs to promote and enhance tourism in regional Victoria

a) The effectiveness of the 'Where the bloody hell are you' campaign by Tourism Australia (at the national level) in promoting and enhancing tourism in regional Victoria is hard to quantify, although the campaign, which appeared to promote Australia overseas as a tourism destination, rather than regional Victoria, has been widely criticised as being a failure.

b) The Tourism Victoria 'jigsaw puzzle pieces' tourism campaign appears to continue to be an effective and resounding success in promoting and enhancing tourism in regional Victoria, especially since the introduction of Destination Gippsland which replaced the former Gippsland & Phillip Island and Lakes & Wilderness (East Gippsland) tourism regions which previously caused some confusion and overlap. The Tourism Victoria web site is also an effective and excellent marketing tool for regional tourism, as are the Visitor Information Centres.

c) Collecting and analysing relevant data on tourism is essential at local, regional, State and National levels to be able to properly evaluate the effectiveness of marketing and promotional programs.

d) Key destinations in regional Victoria need to be better marketed to attract international and interstate visitors. However, more State Government funding needs to be provided to local and regional tourism bodies for promotional and marketing campaigns. Regional areas with low population densities but with major tourism assets need to be subsidised more by the State Government for regional tourism promotions and infrastructure development, as local Shire Councils simply lack adequate rates income to fund such programs to a greater level than at present.

e) Accommodation businesses such as hotels, motels, bed and breakfasts and self contained accommodation facilities need to be listed in central alphabetical and regional directories under each type of accommodation for ease of reference by tourists. Many accommodation businesses are presently listed under their respective member organisations, networks or associations depending on their affiliations, rather than in a comprehensive central listing of every property. The latter could include any particular affiliation(s) that the property has with accommodation groups, networks or member associations, but will make selection of properties by tourists much easier within each region. Only registered tourism accommodation and other service business should be listed and other "backyard" operators should be carefully monitored and action taken against them.
(4) Initiatives to increase both international and domestic visitor nights in regional Victoria

a) Convert and expand the small airport currently used by light aircraft at Tooradin on Westernport Bay into Melbourne’s second international and third domestic airport, as it is located away from housing in an area of flat land, yet close to the demographic centre of Melbourne (around Glen Waverley) in a major population growth corridor with possible public transport access to Melbourne City by extending the suburban train line from Cranbourne to Tooradin. It is also located close to Victoria’s major tourism attractions of Phillip Island, Gippsland, Wilson’s Promontory National Park and the Mornington Peninsula. Convenient access by road and public transport bus (and possibly new very fast train) services could be possible from this airport to the Sorrento to Queenscliff Ferry across Port Phillip Bay, facilitating quick and scenic access to the Great Ocean Road via the ferry service, rather than along the Geelong Road.

b) Establish a new Maglev (or TGV) very fast train (VFT) service, as established in Japan and Shanghai, in a ‘figure eight’ configuration linking Greater Melbourne to Victoria’s major regional tourism destinations, and these destinations to one another and the suggested new second Melbourne international airport at Tooradin. This train service must be able to carry vehicles as well as passengers and should ideally cover most of Victoria. The suggested route for such a very fast train service would be as outlined below, commencing from the proposed upgraded or new Tooradin Airport on the existing site and/or a neighbouring site:

Option 1:

TOORADIN AIRPORT – Hastings (via Blind Bight, Cannons Creek, Pearcedale and Tyabb) – Borneo (via Shoreham) – Sorrento – Point Nepean – Point Lonsdale, over a suggested new “Gateway to Victoria” (VFT and road vehicle) high level bridge (a likely new tourism icon for Victoria) across the heads – Ocean Grove – Mt. Duneed –


Option 2:

TOORADIN AIRPORT – Hastings (via Blind Bight, Cannons Creek, Pearcedale and Tyabb) – Borneo (via Shoreham) –

c) Register all tourism accommodation and service providers to ensure adequacy and consistency of minimum standards and to facilitate the standardised and regular gathering of relevant tourism data to effectively monitor and evaluate promotional and marketing campaigns.

d) Provision of State Government subsidies and promotional funds to Shire Councils in regional areas to supplement their own funds for regional tourism marketing and promotional programs. A funding formula should be determined based on percentages of rates revenue of each Shire Council within each regional tourism region and the value of natural tourism assets in each region.

e) Upgrade of hospitals, health facilities and health services in regional tourism areas to encourage specialists to live and/or work in the regions so that top quality care and treatment may be provided at regional hospitals for people living in the region, visitors and patients who seek quicker treatment in the regions than they would receive in Melbourne’s public hospitals, especially in the event of a very fast train service being established as suggested above. Large, well-equipped regional medical centres, with MRI and other modern radiation equipment for the local specialist diagnosis and treatment of cancers, accident victims, heart disease, etc. Melbourne residents could also conveniently be treated at those centres, if the suggested very fast rail network became a reality, thereby easing the pressures on hospitals in Melbourne, but more importantly, giving patients (including visitors) in Melbourne and regional Victoria quick access to the top specialist medical services. It would also create opportunities for training medical specialists in the regions.

f) Upgrade and develop new infrastructure in regional tourism areas, including improved roads, high standards of accommodation for all market segments, toilet facilities, provision of playground and toilet facilities at lookouts along major tourist routes, develop and improve uniform tourism and directional signage, including tourism operator signage.

g) Develop strategic town plans in each Council’s region to improve the presentation of the towns and provide for improved visitor amenities at major tourism destinations.

h) Review and improve Visitor Information Centres and their locations to provide optimum convenience, maximum effectiveness and assistance to visitors.

i) A proposed deep-water port facility currently under consideration for Barry Beach near Foster in South Gippsland should be designed to service large cruise ships in addition to cargo vessels for which this regional port was first considered. This would enable passengers on cruise ships calling at this facility, before continuing on to Melbourne or Sydney, to tour South Gippsland’s beautiful Prom Country, including Wilson’s Promontory National Park,
where they can witness our unique wildlife (one of our greatest tourist attractions to overseas visitors) in their natural habitat, rather than view the captive animals in zoos. They could also go on to Phillip Island. It could prove an enormous boost to tourism for that region.

j) Expansion of the network of natural gas reticulation, from the natural gas sources on the coast, branching outwards to all regions throughout Victoria, along the major road routes. We export our natural gas in huge volumes to China at nominal cost, but most of our own rural & regional population and businesses have to pay through their noses for LPG, with no subsidies for them like those enjoyed by natural gas users in Melbourne! Natural gas should also be used to power motor vehicles, especially hire car fleets in rural & regional tourism destinations, with facilities for cars to be filled with natural gas in local service stations and in the garages or carports of tourist accommodation facilities and the homes of property owners in the area, with users being billed on their domestic natural gas accounts. This will need leadership by governments and motor manufacturers will need to be given incentives to develop motor vehicle engines to this end. The environment will benefit from lower greenhouse gas emissions from vehicles powered by LNG.

k) Establishment and development of an engineered reticulation system for flood and drought-proofing the state, by harnessing flood waters from watercourses once they rise above a certain level, and piping the flood waters using large pipes to large inland water storage systems (e.g. converted disused quarries, large volume artificial underground and/or ground level tanks) to be held until needed for irrigation during periods of drought or for fire fighting, when the water could be pumped (using solar and/or wind-power) along the same system of pipes to areas of greatest need. The system could be funded jointly by government, private industry, councils, private benefactors (e.g. Richard Pratt) and insurance companies, who stand to benefit by saving millions in potential claims. A by-product of such a system could be the potential for electricity generation by installing turbines in the large water pipes in the system.

l) Development of more bicycle paths and walking tracks in rural and regional Victoria.
(5) The efficacy of existing mechanisms at a National, State and local level to address the impact on regional tourism of natural events such as bushfires, floods and drought, and effective measures to drive long term economic recovery

a) Negotiation of a State-wide Master Insurance Policy to underwrite consequential loss of revenue by registered members of tourism organisations as a result of natural events such as bushfires, floods, earthquake or drought (exceeding a nominated minimum period). The policy would need to be negotiated with Australian and Overseas insurers by the Federal and State Governments on behalf of tourism and other businesses, Councils and other stakeholders in regional tourism areas who stand to be adversely affected or ruined by the consequential losses of revenue following such defined natural events. All levels of government and stakeholders in regional tourism could be required to contribute to the cost of the premiums for such an insurance policy.

b) Undertakings by all levels of government to provide additional special funding for marketing and promotional programs following such natural events to regenerate regional tourism in areas adversely affected by such natural events.

c) Undertakings by all levels of government to provide additional special funding for replacement of overhead powerlines damaged by natural disasters such as bushfires with underground power transmission lines.

d) Undertakings by all levels of government to provide additional special funding for replacement and/or repair of signage, walking tracks, bridges, and other public or national parks infrastructure damaged by natural disasters such as bushfires.
(6) Opportunities to leverage private investment and commercial activity in regional tourism infrastructure, including ecotourism

It is acknowledged that the major infrastructure developments such as the new airport and VFT projects suggested in this submission would require considerable capital investment, probably on a scale equivalent to or even greater than Australia’s last major infrastructure project - the Snowy River Hydro-electric Scheme. Therefore foreign investment and local private investment should be encouraged and leveraged in partnership with funding from the Victorian, Federal and Local Governments and superannuation funds for all the long-term infrastructure projects suggested in this submission, with appropriate attractive taxation-free periods granted to both local and foreign investors to apply from the date they first make a profit from their investments in rural and regional tourism infrastructure. Mums and Dads investors could be encouraged to invest in and use the VFT service by being offered initial free travel for limited periods and travel concessions/discounts for a further period after completion of the VFT project, which may need to be developed in stages.

Recommended references:


c) The most awesome and highest bridge in the world, located in Southern France: visit the website at http://bridgepros.com/projects/Millau_Viaduct for details of location and construction as an illustration and example of a “Gateway to Victoria” bridge Victoria could build to span the heads from Point Nepean on the Mornington Peninsula across to Point Lonsdale on the Bellarine Peninsula, as suggested in this submission.

Appendix:

1) Looking down the track at very fast trains published by the Australian Academy of Science
3) Maglev technology promises transportation revolution, but it is a tough sell – published by the Age Company Ltd, September 23, 2006 (Sourced direct from an overseas newsagency as an additional service to readers. Spelling follows North American usage, along with foreign currency and measurement units)
4) Shanghai mulls second MAGLEV train to neighbouring Hangzhou – published on the internet by YAHOO! News Australia & NZ
5) The most awesome and highest Bridge in the world – the Millau Viaduct in Southern France
6) Pictures of Architects’ models of proposed new international airport to be constructed in the south coast town of Hambantota in Sri Lanka.
Looking down the track at very fast trains

Australia still awaits a government decision on a very fast train link between our major cities. Worldwide, the debate continues about the merits of different kinds of very fast train.

Contents

Key text

Box 1. The centrifugal effect and tilt trains
Box 2. How the maglev works

Activities
Further reading
Useful sites
Glossary

Key text

Australian trains are plodders. It takes the Indian-Pacific 18½ hours to travel between Sydney and Broken Hill, a distance of 1100 kilometres (at an average speed – including stops – of 60 kilometres per hour). Even the country's fastest train, the XPT, takes just over 4 hours to travel from Sydney to Canberra (310 kilometres).

Some people say we should use 'tilt' trains, which are faster than current Australian trains (but still slow by world standards) and can use existing tracks (Box 1: The centrifugal effect and tilt trains). But most train enthusiasts know that when it comes to real speed, there are only two contenders: the current crop of 'very fast trains' that have wheels and run on steel tracks; and the more imaginative magnetically levitated trains, which excite the mind but are yet to be tested commercially.

How fast is very fast?

The fastest trains in commercial operation today are the French train à grande vitesse (TGV), the Japanese shinkansen (or bullet train) and the German InterCity Express (ICE). The TGV routinely travels at 300 kilometres per hour through the French countryside and has been clocked at 515 kilometres per hour in test runs. The bullet train averages 262 kilometres per hour between stations and has recorded 443 kilometres per hour in test runs, while the ICE has a top operational speed of 280 kilometres per hour and has recorded 408 kilometres per hour in trials.

These trains have several things in common:

- They all use electric motors (some very fast trains still run on diesel, but these are slower than their electric counterparts).
- They all have steel wheels that run on steel tracks.
- They have aerodynamic designs to decrease wind resistance - in some ways they look like long, thin aeroplanes without wings.
- They all require special lines to achieve their maximum operating speeds – in particular, these need to be as straight as possible, because very fast trains and tight bends don't mix well (Box 1). Nevertheless, these trains can also run on conventional lines at reduced speeds, a great advantage when approaching major urban centres.

Let's look at one of the most successful of these trains, the TGV, in slightly more detail.

Innovations in the TGV


31/05/2007
Many of the innovative aspects of the TGV are in the design and placement of **bogies**. Bogies consist of two or more pairs of wheels, their axles and a connecting frame that supports the carriages (usually called cars) above. At high speeds, the vibrations produced by contact between the wheels and the rails increase dramatically. This can cause the bogies to sway from side to side, which in turn can damage the track and, in severe cases, derail the train.

While developing the TGV, engineers found that increasing the distance between axles in the bogies could reduce this instability. In addition, since instability increased with increasing bogie weight, they moved the electric motors, usually mounted on the bogies, and suspended them from the bottom of the cars.

Bogie placement was also changed. Conventional train carriages have two bogies each, one towards each end. In the TGV, cars are attached to each other semi-permanently, with the front end of one car and the back end of the next car resting on a common bogie. In this way, each car effectively uses only one bogie (two halves).

Efforts are continually being made to reduce the overall weight of the train, largely because the lighter the train, the less stress there is on the track (therefore lowering maintenance costs). Reducing the number of bogies saves weight. In addition, new, lighter materials are used in the construction of the trains. Even the seats are now made of lightweight carbon fibres, magnesium and composite materials.

**Wheels on tracks or levitated**

While the TGV, the bullet train and the ICE all use established technology – electric motors and steel wheels – revolutionary technology has produced a high speed train which floats on a magnetic cushion of air above a special track.

**Maglev**

The maglev differs radically from its more conventional high-speed cousins. It doesn't have wheels and it doesn't run on a steel track. It doesn't even have an on-board motor. The motor that propels the maglev is in the special track, and the propulsion comes from magnets.

In maglev technology, electromagnets (devices that become magnetic when fed an electric current) are mounted on the train and in the track (usually called a guideway). The electromagnets levitate, guide and propel the train along the guideway (**Box 2: How the maglev works**).

**Maglev vs conventional high speed trains**

Maglev technology has several theoretical advantages over conventional high-speed trains. Since there is no wheel-to-track contact, less energy is lost due to friction and the trains create less noise. Maglevs also use less energy to achieve the same speed as conventional very fast trains.

In addition, since the motor is in the guideway rather than on the train, it is possible to increase its power on steep sections. This means that maglevs can climb steeper grades than conventional high-speed trains, reducing the need for tunnels.

Despite such advantages, maglevs remain commercially unproven. In comparison, trains like the TGV, the bullet train and the ICE have been formidably successful. Millions of people have travelled on them; hundreds of thousands use them each day. Each new generation of train gets faster, and they boast an impressive safety record.

One of the biggest barriers to maglevs is the need for a whole new infrastructure. Their guideways need to be constructed from scratch, a costly and financially risky venture, at least in the early stages. In contrast, conventional high-speed trains can run on existing tracks through urban areas, and the high-speed portions can be constructed in stages.

**Safety of very fast trains**

Very fast trains are safe compared to most other forms of motorised transport. For example, the TGV, which...
commenced operation in 1981, travels about 10 million passenger kilometres each year. It is yet to have an on-board fatality, although a number of people have died in collisions at road crossings.

But this is not to say that major disasters are impossible. In June 1998, an InterCity Express, travelling at about 200 kilometres per hour, derailed near Eschede in Germany, killing 102 people and injuring hundreds more. The cause of the accident is still under investigation.

The future of high speed trains

Commentators seem to agree that very fast trains – the conventional ones, at least – will form a significant part of the international transportation scene in coming decades.

But Australia is something of a special case. With our small population dispersed in relatively small towns and middle-sized cities across vast distances, the commercial viability of very fast trains remains in doubt. There is no shortage of ideas: some people talk of a high-speed train network linking Melbourne to Brisbane (via Canberra), and another, linking Melbourne and Darwin, has also been proposed.

Are we on the cusp of a transport revolution in Australia, or are our trains destined to remain plodders? Should we launch straight into technology, or should we consider the tried-and-true alternatives? Expect the debate to continue, full steam ahead.

Box 1. The centrifugal effect and tilt trains

Think about what happens if you are travelling in a car that takes a corner at high speed. You are forced against the car door and the drink in your lap overturns. These things occur because momentum keeps you and the drink-bottle moving in a straight line while the car itself has started to turn. This phenomenon is known as a centrifugal effect.

Similar things will happen if a train takes a bend too fast. Standing passengers will lurch over and luggage may fall down from racks. If the centrifugal effect is strong enough (and it has to be very strong), the train itself might fall off the tracks.

Smoothing out the bends

Train companies wish to avoid disturbing their customers with centrifugal effects, so they adopt strategies for 'smoothing' out the bends and corners that a train inevitably has to take.

The centrifugal effect is proportional to the square of the velocity of the train and inversely proportional to the radius of the bend in the track. This means that if you want to double the velocity of the train but keep centrifugal effects constant, you must increase the radius of the bend four-fold.

Tilting the train

Another strategy for coping with centrifugal effects is to tilt the train itself – this is used, for example, by the Swedish X2000 series that can travel up to 200 kilometres per hour. If the train is tilted, and with it all the tables, seats and passengers, then the tendency for everything to slide down this slope can exactly balance the centrifugal tendency for them to move towards the outer wall of the carriage, and everything feels normal.

The actual tilting of the train is done by pivoting individual carriages on their bogies using pistons. The pistons are controlled by computer and move up or down depending on the strength of centrifugal effect. By counteracting the centrifugal effect in this way, 'tilt' trains can travel up to 40 per cent faster around curves than conventional trains.

Tilting technology was tried in Australia on the Sydney-Canberra line for a 2-month period in 1995. A trip that usually takes 4 hours and 5 minutes on the XPT was reduced to 3 hours and 25 minutes, a timesaving of about 16 per cent. A new tilt train service is to be introduced later this year between Brisbane and Rockhampton. The
service should reduce travelling time from 9.5 hours to 7 hours.

Related sites

- Force: Centripetal vs centrifugal (Public Broadcasting Service and Turner Adventure Learning)
- Tilting trains (Oliver Keating)

Box 2. How the maglev works

If you put two magnets together they will either repel or attract, depending on their polarity: two magnets with the same polarity will repel and two with different polarities will attract. Levitating, guiding and propelling the maglev is based on these properties of magnets.

Levitating the maglev

The attraction or repulsion of electromagnets is used to levitate a maglev. On one breed of maglevs, the Transrapid, levitation magnets fitted to the train are attracted to support magnets on the underside of the guideway. A computer-controlled system ensures that the vehicle levitates – via this attractive force at a constant distance from its guideway. In other words, the two magnets attract each other and thus lift the carriage, but the attraction is not strong enough so that the two magnets make contact with each other. The train therefore 'floats', making no physical contact with the guideway.

Some other types of maglev use the repelling force of magnets with the same polarity to levitate the train. In all types, guidance magnets ensure that the train remains at the appropriate distance from the vertical edge of the guideway.

Propelling the maglev

Electromagnets also propel maglev trains. A series of electromagnets are laid out in a line along the guideway and electromagnets are installed on the train.

An electromagnet on the guideway pulls a train magnet towards it because it has an opposite polarity. As the train passes over the guideline magnet, the polarity of the magnet is reversed so it matches that of the train magnet, thus repelling the train magnet. As the train hurtles along, the electromagnets in the guideway switch on and off and reverse polarity as required. Electric current activates the guideway electromagnets only when the train passes over them.

Related sites

- How maglev trains will work (How Stuff Works, USA)
- Maglevs (magnetically levitated trains) (Oliver Keating)

Activities

- University of Virginia (USA)
  - How things work: Magnetically levitated trains
    Clear answers to a number of questions about magnetism and electromagnets, as well as a few suggestions for related demonstrations.

- How Stuff Works (USA)
  - How electromagnets works: Experiments to try
Very fast trains-Print version

- Jefferson Lab (Southeastern Universities Research Association, Inc and US Department of Energy)
  - Magnets and electromagnets
- Illinois Institute of Technology, USA
  - Magnets, electromagnets and fields of force
- Kyrene School District (Arizona, USA)
  - Magnetic levitation vehicles
    Students design, build and test a magnetic levitation transportation system.
- The European Railway Server
  - TGV card models

Further reading

New Scientist
8 August 1998, page 7
Prepare for lift off (by Duncan Graham-Rowe)
A new maglev system uses permanent magnets and a novel linear motor.

11 July 1998, page 18
Silent but speedy (by Jonathan Beard)
A new type of track, based on a bed of cork composite, should make high speed train lines less noisy, longer lasting and cheaper to maintain.

Scientific American
January 2000, pages 64-69
Maglev: A new approach (by Richard F. Post)

October 1997, pages 68-73
How high-speed trains make tracks (by Jean-Claude Raoul)

October 1997, pages 74-76
Fast trains: Why the US lags (by Anthony Perl and James A. Dunn Jr.)

October 1997, page 77
Maglev: Racing to oblivion? (by Gary Stix)

September 1995, page 74-75
High-speed rail: Another golden age? (by Tony R. Eastham)

August 1992, page 83-93
Air trains (by Gary Stix)

Useful sites

High speed rail (Oliver Keating)

Describes a variety of very fast trains, including maglevs and tilt trains.
http://www.o-keating.com/hsr/

The TGVweb (European Railway Server)

'Introduction' includes background information, history of the TGV before 1981 and frequently asked questions. 'The future TGV' includes recent TGV research and development.
http://www.railfaneurope.net/tgv/tgvindex.html

Australian very fast trains – a chronology (Australian Parliamentary Library)

Outlines the various proposals to build high speed rail lines in Australia.

Glossary

electromagnet. A device that produces a magnetic field using an electric current flowing through a coil of wire, generally wound on a soft iron core. Electromagnets are temporary magnets – when the current is turned off, the magnetism is gone.

polarity. Describes a situation in which there are opposing physical properties at different points in an object or system. When this refers to magnetic poles, the two opposite poles are called 'North' and 'South'; when it refers to electric charges, the two opposite properties are called positive and negative. Unlike poles (and charges) attract; like poles (and charges) repel.

transformer. A device consisting of two coils of wire wound on a soft iron core which is used to change the voltage of an alternating current. Transformers can either increase the voltage (a step-up transformer) or decrease the voltage (a step-down transformer). TV receivers have a step-up transformer that increases the voltage enough to operate the picture tube, and also a step-down transformer to reduce the supply voltage (240 volts) to the 5 volts needed to run transistors.
World's Fastest Train, Which Runs at a Speed of 500 kph

A test ride at the foot of Mount Fuji on a magnetically levitated (maglev) train is proving extremely popular with curious people who want to experience a ride on the world's fastest train, which runs at a speed of 500 kph.

"This is a good chance to get in touch with next-generation technology," said Kazuhiko Nozue, 32, from Hamamatsu, Shizuoka Prefecture, as he boarded a maglev train with his two children. "We wanted to experience ultra high speed,"

Nozue was among 246 groups of people selected from among about 16,700 applicants to ride on a maglev train in May. He was chosen after two unsuccessful applications.

Central Japan Railways Co. (JR Tokai), which is testing the train on an 18.4-km experimental track in Yamanashi Prefecture, has offered test rides 12 times since the testing began in July 2000. The average applicant has from one chance in 70 to one chance in 140 of being selected, company officials said.

The maglev floats on a magnetic field, eliminating wheel friction at high speeds. An unmanned maglev has sped to a new world record of more than 550 kph, topping the speed record for conventional trains held by the French TGV, which hit 515 kph in 1990.

About 30 seconds after departure, the train's speed surpasses 130 kph, and the wheels are retracted like those of an airplane. When the train reaches 160 kph, the noise of friction with the track disappears and no vibrations can be felt. The train floats 10 cm above the track and passengers feel as if they are flying at low altitude.

In a short time the speed exceeds 300 kph, the maximum speed that the Nozomi bullet train runs on the Tokaido and Sanyo Shinkansen lines. Electric boards at the entrances to the seating areas flash when the train's speed hits 452 kph, usually setting off excited cries and picture-taking among the passengers.

"This train has registered the world's top train speed of 552 kph," a JR Tokai official said. "In the future, it will connect Tokyo and Osaka in one hour."

After the 25-minute test ride, Ryu Saito, from Yokohama, said, "You can move freely because there are no seat belts. When it is put into practical use, I would use the maglev rather than an airplane."

But an executive of another JR group company is critical of the train, saying, "It's the same as a new attraction at an amusement park."

A Land, Infrastructure and Transport Ministry official said there are many problems to be resolved before the maglev can be put into
practical use, such as its demand and economic effects, the huge
construction cost, estimated at 8 trillion yen, fixing fares, and
competition for passengers between the maglev and bullet trains on the
Tokaido Shinkansen Line.

But JR Tokai executive Chuji Morishita said, "This is the third railway
traffic revolution, following railway construction in the Meiji Era and
the Tokaido Shinkansen Line after World War II."

"The inauguration of the maglev will break Japan's stagnation, both
politically and economically," he reckoned.

The Original Story from: japantimes

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31/05/2007
Maglev technology promises transportation revolution, but is a tough sell

September 23, 2006 - 8:50AM

Engineers have been trying for decades to perfect and promote the use of powerful electromagnets to suspend trains above their tracks so they can travel as fast as some airplanes.

But the highly touted maglev trains, which exist commercially in China and Japan, have not caught on worldwide despite their promise to revolutionize transportation.

The budding industry suffered another setback Friday when human error caused a high-speed magnetic train in Germany to crash into a maintenance cart on a test track, killing at least 25 passengers. It is believed to be the first fatal wreck involving the high-tech system.

Maglev — short for magnetic levitation — uses super magnets to float a train above a cushion of air at speeds of up to 300 mph (483 kph), allowing it to glide without the friction of clanking steel-wheel-on-steel-rails trains.

Interest in maglev technology gained momentum over the last several decades with countries building prototypes. In the United States, lack of government support and concerns about costs and expansion of conventional train tracks have largely prevented the technology from flourishing.

Many projects were derailed when federal funding for maglev research was cut in 1975. Although the government has supported several low-speed maglev projects in recent years, they are still in their infancy, said John Harding, the former chief maglev scientist for the Federal Railroad Administration.

Several U.S. cities are eyeing the possibility of eventually building high-speed maglev lines, including a route from Los Angeles to Las Vegas and one from Baltimore to Washington D.C. But those ideas are still far from reality.

"There's enthusiasm for these projects, but they aren't really going anywhere," Harding said.

One of the biggest hurdles is money. High-speed maglev lines are expensive to build because engineers need to construct a whole new infrastructure for the floating trains.

China developed the world's first commercially operated maglev in 2003, at a cost of $1.2 billion (Euro940 million). The system connects Shanghai's Pudong International Airport with the city's financial district, with trains covering 19 miles at speeds up to 270 mph (435 kph). A typical trip takes about seven minutes by train, compared with an hour by taxi.

The Chinese government will begin work this year on a second maglev line linking Shanghai and the resort city of Hangzhou, a $4.4-billion (Euro3.4-billion) project.

"If we can get a low-cost maglev system that works, we could very well significantly change the way people live and get around," said Ray Peithel, a transportation expert at Virginia Institute of Technology.

Magnetic levitation works by suspending, propelling and guiding vehicles with electromagnetic force.

A magnetized coil runs along the track, known as a guideway, which repels magnets on the undercarriage of the train, allowing it to levitate several centimeters high. When a current is passed through, the electromagnetic forces pull and push a train along the guideway.
Maglev technology promises transportation revolution, but is a tough sell - Breaking - Technology...

The world speed record was clocked in 2003 by a maglev in Japan, which travelled at 361 mph (580 kph) on an 11-mile (18-kilometre) test track.

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More Technology

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Shanghai mulls second MAGLEV train to neighbouring Hangzhou

SHANGHAI, (AFP) - China is mulling the construction of a second commercial magnetic levitation train (MAGLEV) from Shanghai to neighbouring Hangzhou city in Zhejiang province, state press reported.

"At the request of both governments of Shanghai and Zhejiang province, we have been doing the survey for a MAGLEV line between the two cities," the Shanghai Daily quoted Xia Guozhong, spokesman for the Shanghai Maglev Transportation Development Co, as saying.

"But the survey hasn't been completed and the project is still waiting for central government approval," Xia said.

If the project wins the green light, the high-speed link between the two eastern cities would be completed by 2008, the newspaper said.

More than a year ago, when the Shanghai MAGLEV completed its first 19 kilometre (11.7 mile) run from the eastern part of the city to Pudong international airport, then Chinese premier Zhu Rongji agreed to the construction of another train using the same German-made futuristic technology.

However, a Shanghai to Hangzhou line was put in doubt after several state press reports said China had decided against the use of MAGLEV for the planned expansion of its massive railway network.

In particular, Chinese officials have yet to announce who they favour to build a Shanghai to Beijing rail line.

Local press reports claimed that France's TGV had won the contract to construct the multi-billion dollar high-speed link with a conventional wheel-based carriage although TGV has denied this.

The MAGLEV technology developed by Transrapid International, a consortium comprising German industrial giants ThyssenKrupp AG and Siemens, went into commercial operation in Shanghai in January after facing repeated problems and delays since its launch a year earlier.

Built at a cost of 1.2 billion dollars, it takes eight minutes to reach its destination at speeds of up to 430 kilometers (260 miles) per hour.

More than 80 percent of the passengers on the usually empty train are thrill-seeking tourists rather that travellers trying to get to the airport, the newspaper said.

Critics say this is because it does not connect with the centre of the city.

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