

**ALSO IN THIS ISSUE**

**Continued praiseworthy performance by PMOL**

P3

**Parry Building Products surge**

P3

Everything Fits Nicely - Progress with 139 stretched railcar, with UK & Malaysia projects in mind

P4/5

500 Flywheels are coming



Go Ahead Group goes hi-tech with big order for flywheel hybrid buses, but the need remains for something simpler. PPM to go off the rails

P6

Discussions over possible trials & demonstration locations for 139000 after completion

P7

**PPM 50 HYBRID CHASSIS LEAVES FOR BLOXWICH**

Work turning 139000, the PPM 50 into PPM's first Turbo-diesel/flywheel hybrid railcar was temporarily stalled after the Winding-Up in July 2013 of the JPM Parry & Associates engineering business. Technology Strategy Board funding was withdrawn, but the suppliers of Lightweight Community Transport and PPM shareholders provided continuing funding. After negotiation of an equitable division of the activities and funding between the principal sponsors, Lightweight Community Transport, the integrators and finishers, Trailways Ltd of Bloxwich and PPM, the chassis was moved on 21st October. The final stages of the work have now commenced at Trailways works.



**WEST AFRICAN EPIDEMIC CALLS FOR BETTER BUILDINGS—FAST!**

*Rural people in Sierra Leone are constructing improvised isolation centres in a desperate move to try to contain spread of the Ebola virus. Better solutions are needed.*



*Concept of High & Dry raised concrete platform with sheet roof. The internal structure made up of prefabricated panels designed for ease of cleaning*

Intermediate Technology Workshops is working with industrial partners in order to devise a form of building which by combining local skills and materials with specially designed 'clean rooms' made from prefabricated aluminium panels can get a much-needed medical centre built and ready to occupy in a few days. Exponential rate of increase in the number of Ebola cases and the demand for medical facilities far outstripping availability, the disaster emergency convention of providing tents cannot easily meet the requirement. It is essential that there be hard, clean, dry surfaces in wards, theatres and ancillary accommodation. Continued P2, 3 & 8.

**'THUMBS UP' FOR PPM APPROACH FOR KUALA LUMPUR TRAMS**  
Catenary-free systems with modern and historic appearance vehicles



*Top Level Delegation from Malaysia Min of Federal Territories and KL City Hall takes a look at model of Class 139 with historic styling to delight visitors to city. Left to right: Tn. Hj. Abdul Hamid, Undersecretary, Strategic Development. Mr Nik Azmi. Mr Ian Hamilton. Mr Anuar Adam (Private Sector) Datuk Adnan, Secretary General, Ministry of Federal Territories, Mr John Parry, Datuk Hj. Mahadi, Deputy Director-General (Planning). Ir. Nanthakumar, Deputy Director, Infrastructure Planning. Dr Leong Siew Mun Director, Urban Transport K.L. City, Mohd Fahmi Senior Assistant Secretary.*

The evaluation team returned to Kuala Lumpur on October 3rd. Discussions have since been taking place involving the Malaysian authorities, contractors and consultants. Indications of the preliminary findings from the visit is that the technical approach by PPM, advocating smaller vehicles of 60 to 120 passenger capacity and powered by gas - flywheel rather than electric power from overhead wires had found favour with the visiting experts. Preparations P4

## COMMENT

IT'S TIME THAT INTERMEDIATE TECHNOLOGISTS GOT STUCK IN SOLVING THE REAL PROBLEMS INCLUDING *THE BIG ONE*

ONLY A YEAR ON SINCE  
08-07-2013 - BUT IT FEELS LIKE 50

Media reports from West Africa and news of rapid deployment of British army engineers to provide temporary medical accommodation have prompted approaches to 'Parry' offices that there's a lot more which can be done to help. But this calls for new solutions - and speed is of the essence.

A call from TRB Lightweight Structures, one of Britain's busiest and most successful manufacturing firms supplying lightweight panelling materials for construction of fully finished prefabricated shells, for aerospace and railway rolling stock, suggested that sections could be packaged into 'Ikea' style, flat packs and air-freighted into the affected zone and quickly erected into high quality, easy-to-keep clean rooms. It is obvious that in these rooms, medical personnel trying to cope with increasing numbers of infected patients could work more effectively and at less risk to themselves. TRB raised the possibility that the same materials might be applicable in fixed situations such as cubicles or even full sized room spaces. Dealing with the special aspects of the current crisis calls for speed and lightness for ease of transportation, providing surfaces equivalent to those which line the wards and operating theatres of a modern hospital.

TRB Lightweight Structures, Southco the access component supplier, and Parry Building Products have offered to form part of a team of organisations advised by architects and engineers from Warwick University's Development Planning Unit in a programme which would be led by Intermediate Technology Workshops as designers and specifiers.

To say that to make progress in the effort to hold back Ebola is urgent is an understatement. Problems containing the disease abound - I recall in 2005, climbing 7 flights of stairs when the lifts were defunct in the Ministry of Planning building in Central Freetown. It was inevitable to touch the moist-with-sweat handrail, the doors in the buildings, the door handles of cars. Now, with the threat of Ebola seemingly ever-present, in the apartment blocks where one of the residents has become victim and in the hospital where other bodily fluids contaminate apparel, bed linen, utensils and even the internal surfaces of the rooms themselves. there is fear of infections which can pass to other people. including doctors and nurses. Medical accommodation calls for a regime where everything must be kept scrupulously clean. This is hard enough to achieve in conventionally-constructed buildings, where tented accommodation is having to be deployed, it is especially difficult.

Several organisations with relevant resources have been invited to throw hats into the ring ready to participate in devising a good solution, but Intermediate Technology Workshops which have full access to all of the previous JPM Parry & Associates fieldwork experience, is seen as the central organisation which can define, describe and coordinate all of the activities required for the system to be mobilised. No one will expect the work to be done without incurring cost and for a yet-to-be fully launched organisation, the means to meet these costs has to be determined. Intermediate Technology Workshops is that organisation.

'GET STUCK IN' paper page 8.



BY JOHN PARRY MBE

*Just over a year's experience working in close proximity to Government's insolvency service has revealed a great deal about the mind set of legal and financial professionals once they have been let loose with almost unfettered discretion. But the law can never be totally rigid, in the end it has to bend when national interest says it must. Man-made laws, unlike the law of gravity, are at the whims of 150 different nations. A particular action in one country merits a fine, in another the perpetrator's hand can be chopped off. Inappropriate acts by officials and professionals can derive from incomprehension or poor imagination. Harold Steptoe working as an agent for a liquidator might come across an odd looking painting:-*

*"Load of rubbish! it's a woman wiv both eyes on the side of 'er 'ead painted by a Spaniard. If 'e wants to sell his stuff, this bloke Picasso needs to learn how to draw faces. We might get a few quid for the frame though."*

*Relentless pursuit of money as if it is the only thing that matters can make educated and clean-living middle class professionals behave like Genghis Khan and Dickens' Artful Dodger. Or like the shoals of hungry Amazon fish who eat other creatures whether alive or dead. When reprimanded, the professionals sigh and shrug their shoulders "Just doing our job - there's nothing in insolvency legislation that requires the national interest to be taken into account. It's just about money." Really?*

## PRAISEWORTHY PMOL SERVICE RECORD AT STOURBRIDGE ATTRACTING INTEREST FROM MANY PARTS OF THE UK



*The light railcar maintenance depot at Stourbridge*



*Ever increasing number of passengers confirms the popularity of the shuttle service*



*Class 139 flywheel having just been removed to be sent for overhaul and rebalancing.*

**Class 139 railcars enter 6<sup>th</sup> year of intensive operation setting records for patronage and reliability, a tribute to the maintenance backup from the specially built depot.**

The most recent 4 weekly report from Train Operating Company, Pre Metro Operations Ltd registered over 51,500 passenger journeys, the highest ever number in the last 50 years. This confirms the continuing popularity of the 10 minute frequency railcar shuttle which passengers feel they can rely upon, giving a consistent performance over the last year, 99.7% of the scheduled services ran, and on time. Credit is due to the engineering support by PMOL's own fitters backed when called upon by London Midland engineers with occasional problem-solving and design support from Parry People Movers, the manufacturers.

Around Britain, from East Lothian in Scotland, the Welsh Borders of Shropshire, the Thames Valley, Yorkshire Dales, West Midlands and East Anglia there are companies and local organisations keen on restoring passenger services on freight only or mothballed lines. The nature of their interest is no longer stimulated just by the love of trains. The words 'economic regeneration' are frequently heard alongside the now unquestioned realisation that putting a town or a village back on the railway map brings benefits, to local businesses, increases access to jobs, lifts house prices while reducing dependency on the private car which consumes a large slice of household incomes of residents.

PMOL is ready for new challenges and to deploy its directors' experience and knowledge to assist new ventures and take their projects forward, which will require competent operators. Further details P.7

### **PARRY BUILDING PRODUCTS SURGE IN ACTIVITY** Closer liaison between 'Stourbridge' and 'Cradley Heath' improves customer service backup of superior quality machines

In the period after the creation of Parry Building products Ltd in the autumn of 2013, the advantage of being able to draw on the design and development engineering resources still remaining within the Parry People Movers Ltd. team has become fully realised.

Despite the clearly separate ownership and management of the two companies, from the point of view of overseas customers there is a seamless relationship so the new and old customers have the reassurance of having unrestricted access to all of the experience gained from 40 years of fieldwork and technical development.

There are also synergies between the business activities of one company devoted to new construction of settlements and another specialised in affordable urban transportation.

It is especially advantageous for PBP while supplying the means to construct new housing estates to be able to speak knowledgeably about the nature of

potential transport links to areas of employment and commercial activity. Now there's another case for active business collaboration, PPM's knowledge of and access to the automotive supply chain makes it possible to offer quick to construct 'clean rooms' from lightweight panels produced by a high tech manufacturer which will create clinical accommodation inside an Intermediate Technology building.

*Shown below are a stack of highly finished and accurately-formed lightweight panels at the Cambridgeshire works of TRB Lightweight Structures.*



*Above: A consignment of equipment under preparation for a Bangladesh customer at Parry Building Products works in Stourbridge, one of several current orders.*

# PROGRESS IN DEVELOPING LARGER RAILCARS BASED ON THE CLASS 139 UNITS 'EVERYTHING FITS NICELY'

In July 2012 the Porterbrook Leasing Company, which owns and leases the two Class 139 railcars used by London Midland, having discussed the design with 'Parry' and prospective subcontractors stated that it will be possible to increase both passenger capacity and speed 'without compromising the elements of the concept which deliver economic advantage over other trains on certain categories of line'. Set out below is the response by PPM's design engineers showing the steps by which the enhancement of the Class 139 design can come about.

## Drivelines & Energy Storage

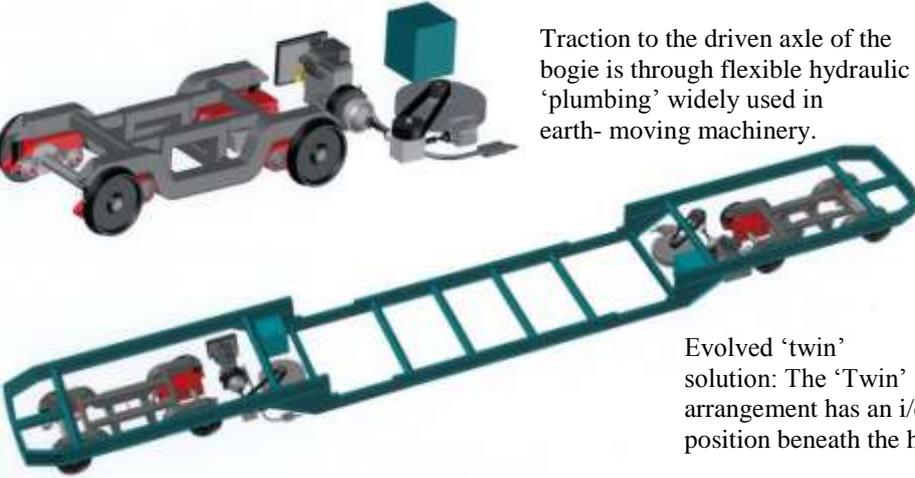
The arrangement amounts to a simple repositioning of the existing Class 139 driveline elements with 'fluid' (hydraulic) power supplied to the bogies.



(Original Class 139 solution still valid) Installing motor, driveline and energy storage equipment linked



*Left: Photographed in 2009 prior to departure from PPM's Cradley Heath base Class 139 railcar 139001 has now operated in service for 5 1/2 years proving the performance and serviceability of the flywheel hybrid traction system.*



Traction to the driven axle of the bogie is through flexible hydraulic 'plumbing' widely used in earth-moving machinery.



*Below: PPM Car 11 built to illustrate an alternative 'historic' outline.*

Evolved 'twin' solution: The 'Twin' arrangement has an i/c engine at each end of the railcar in a position beneath the high floor sections of the chassis.

## Bodywork



Design of the body framework is as a semi-monocoque aiming to meet the structural requirements for UK tram-trains

The Malaysian 'Low-Rider' design places the engine where it is accessible from both sides and top for maintenance and ease of removal. The arrangement also provides extra space for a larger tank holding additional fuel needed to power air-conditioning and longer range operations.

PPM's plan is to establish a small-scale assembly facility at Cradley Heath producing a drivable chassis ready for export and also suiting domestic markets. Large fleet orders will be outsourced to larger scale facilities.



## BRANCH LINE RAILCAR HIGH FLOOR OPTION



A replacement market is emerging in the UK for older generation 'DMU's' such as the class 153 single carriage Sprinters which are needed to extend the length of Class 15X trains for services where passenger demand exceeds capacity.

The Class 139-2 railcar was a level floor variant with passenger doors positioned to provide level access to platform height.

## Hybrid Drive And Running Gear



Engine, bevel gearbox and flywheel mounted on a sled or raft for ease of installation.



Wheel set and final drive gears



Hydrostatic pump with similar motor provides two way transmission of power to and from axle.

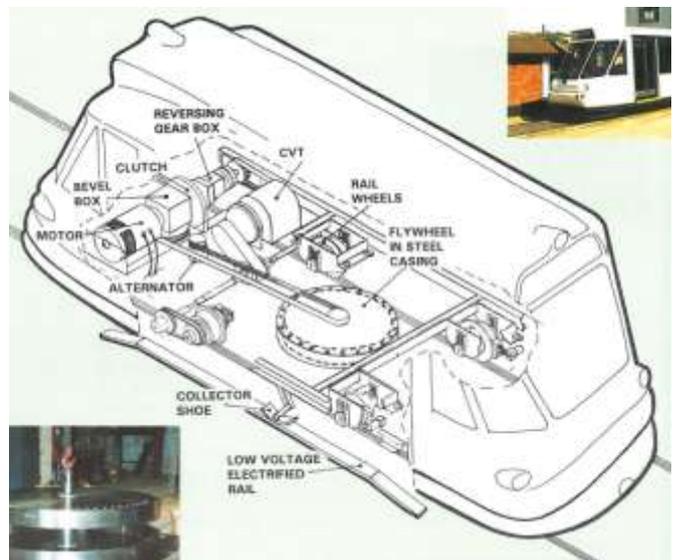
## ELECTRIFICATION

**View Parry People Mover Video**  
**Search: ITW Parry Channel at Youtube**  
**Link: [http://youtu.be/Js\\_mOqK0C2g](http://youtu.be/Js_mOqK0C2g)**

The original electric form of the PPM railcar proved the concept of flywheel energy being capable of powering a street running system without overhead wires, receiving electric current at stopping places. In response to market demand (e.g. from China) PPM is willing to adapt the tram train design to this electrified system. This will call for enhanced performance over the earlier form which operated successfully in Bristol in 1998-2000.



Left – Trial service by flywheel electric Railbus



# ADDRESSING THE CARBON EMISSIONS PROBLEMS OF TROPICAL CITIES:-

WHAT ABOUT ALL OF THE BUSES GOING NOWHERE FAST, WASTING A SMALL FORTUNE IN FUEL?



Rail journeys are preferred because travel by road is subject to all manner of interferences making journey times hard to predict. However it has to be accepted in a vast number of localities it is inevitable for the journey to be made by road. Public transport is essential which means that countless millions of people will continue to make their daily journeys by bus. Buses are important but will have to remain cheap vehicles.

Road conditions with vehicles continually forced to stop and start in queues is an expensive fact of life. Crawling at slow speed uses far more fuel than in free flowing traffic. Brakes and transmissions wear out more quickly. Other disadvantages are the reduced productivity of expensive vehicles, as slow journey times reduce the number of trips made.

To encounter traffic jams to write home about, visit Accra, Nairobi, Dar-es-Salaam, Jakarta, Mumbai, or countless other tropical cities. ITW consider that its relationship with PPM and high vacuum specialist Allectra can lead the way to a low cost carbon saving product with world-wide suitability. The answer is the use of energy-storing flywheels in city buses.

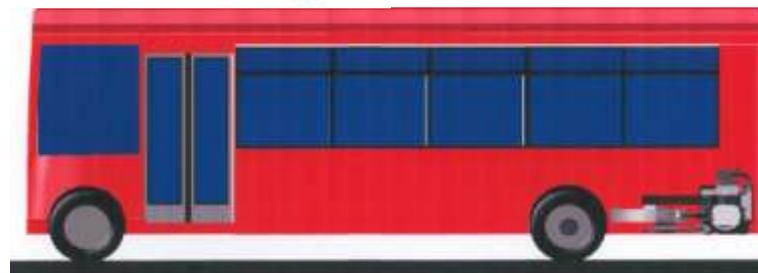
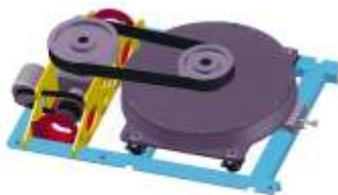
A 'Eureka' solution to the problem lies in the hands of the designers of the buses. Where the bus is caught in very slow moving traffic, the use of a large diesel engine is very inefficient - far better to have a secondary source of traction available. Should this be an on-board battery pack - the conventional hybrid solution? As the owners of pure electric and plug-in hybrids are learning, batteries do save a lot of fuel driving in crawling traffic. But replacing batteries is expensive.

Experience in operating Class 139 railcars at Stourbridge has revealed that for the 10 minutes or so after a railcar has completed its days run, it is necessary to move short distances in the depot. Rather than re-start the engine, the drivers use the still-spinning flywheel for short distance manoeuvres, with no fuel used at all.

Once the new PPM-Allectra high vacuum flywheel becomes available, the facility for slow manoeuvring with the engine not running will extend to 20 minutes or more. This feature would save fuel in stop start traffic, and at the other times because a smaller engine is used there are further savings.

The Go Ahead Group is one of the parent companies of London Midland which through its sub-contract with Pre-Metro Operations runs flywheel

*Below: Flywheel transmission module on installation raft.*



A SMALL CITY BUS EQUIPPED WITH FLYWHEEL-HYBRID DRIVELINE

*PPM has begun discussions with prospective international partners to get modified*

energy railcars at Stourbridge. It has been taking a look at flywheels for its buses.

Aiming for a lighter form of flywheel, Go Ahead, working with GKN engineers who learned much about flywheel potential from Parry, has carried out experimental operations with a batch of 6 older generation buses with the original driveline replaced to incorporate high speed flywheels. The results have been so good in fuel saving it has been announced that the Go Ahead fleet is to acquire as many as 500 buses similarly equipped for use in London and Oxford.

PPM engineers are certain of the practicality to adapt and evolve the railcar driveline to produce an effective flywheel-hybrid small bus. This would be equally fuel efficient but using less elaborate engineering than the 50,000 rpm composite flywheels and other forms of hybrid being put into the UK buses.

Hybrid battery-diesel buses are being sold costing over £100,000 more than standard vehicles. Such technology is unaffordable for bus operators in developing countries. The need is for a less complicated version adapted from PPM's railcars.

# PATHFINDER ROLE FOR REFURBISHED PPM 50 RAILCAR AS LOCAL GROUPS URGE BRANCH LINE REOPENING

## Back on the Railway Map

Once the PPM 50 railcar has completed its refit, the principal sponsors Lightweight Community Transport and Parry People Movers can begin serious take up of the expression of interest from local railway promoters in different parts of the country. The favourable 'dynamics' which will assist creation of a solid business proposition include:-

- Providing an improved journey-to-work to a centre of employment for existing commuters who presently have to put up with an indirect, infrequent or otherwise inconvenient train service, or no service at all.
- Enabling or enhancing the prospect of developing significant areas of land including brownfield sites creating new equity.
- Increasing the 'footfall' for local businesses in the re-connected localities as a result of people from elsewhere finding them easier to visit.
- Improving opportunity for obtaining jobs for the local residents especially recent school-leavers either in the town or village itself or the target destination.
- With up to 1000 previous car commuters using the trains there will be a measurable reduction of traffic in the locality which has been put back on the rail network.

It can be calculated that a town of say 20,000 inhabitants collectively possesses residential and commercial properties worth about £1 billion. Getting back on the Railway Map if adding 5% would increase the collective value by £50 million.

### Railcar 139000 as it will appear following refurbishment.



## Dealing with Sceptical Attitudes

The opening of passenger services on lines currently reserved for freight would seem so beneficial that it should be happening in many parts of the UK but in a society dominated by professions that are skilled in stopping things, sparks of enthusiasm are quickly stamped out by nay-sayers simply expressing the view that it's all so difficult, it can never happen.

Parry People Movers, Pre-Metro Operations and Lightweight Community Transport all subscribe to the view that a competently-organised working demonstration of a fully fit-for-purpose railcar, counters the sceptics by showing that it can happen.

The upgraded original prototype Class 139 railcar will be offered to rail service reinstatement champions to be used for 'shadow' passenger services on lines where none presently run. The prospect for projects being able to move forward could be considered to be strongest where powerful public and private sector organisations are lining up behind the project concerned, e.g. Tata Steel in Don Valley in S. Yorks and Dudley.



*Being prepared for fitting back together again, the body and chassis of the PPM 50 railcar at Trailways works in Bloxwich (early November 2014)*



Tata steel-owned line in S. Yorks being assessed for suitability to operate public passenger services.



Using the clear rail corridor between Dudley Town and a local station on the West Coast Mainline being investigated by Dudley MBC.



*Reinstatement of passenger services on a line connecting the town of Oswestry and a local station on the main North South Railway line will make Oswestry more convenient for people making daily journeys to Manchester, B'ham and Cardiff.*



*Other promising localities where local pressure groups are beginning to be actively interested in rail service reinstatement include Oswestry and Wensleydale.*

*Arrangements were made 9 years earlier for a period of demonstration services along the Wensleydale Railway. In recent months a new station has been built close by Northallerton Station to assist the interchange.*

### Redirecting Resources

The really serious problems in the World are to do with the imbalance between wealth and poverty and the uneven geographic distribution of resources. Without the erection of a USSR-style 'Iron Curtain' there will continue to be desperate efforts made by impoverished people to gain entry into the economies of richer countries. Tens of thousands are dying in the effort to cross illegally the Mediterranean Sea or US-Mexican border. But most research and development efforts are not being deployed on innovations that make poor people richer, but instead of making life increasingly comfortable or more entertaining for the 5% of the Worlds' people whose level of wealth is barely imaginable to a landless migrant from a poor country.

It is time to 'get stuck in' to the task of creating new technologies which justify the price paid on an economic basis but which improve the well being, the productivity and living conditions of people in poorer countries and reduce any wasteful consumption of scarce resources, and the hopelessness which comes from lack of livelihoods. The aim is to change nations from being places to escape from into ones where there is a future for the present generation and their children.

### Role of Intermediate Technology

The aspirations of people are not any different between rich and poor. Food should taste good, and be nutritious, houses secure, comfortable and weatherproof, transport safe cheap and dependable. But the means of achieving such amenities will often need to be very different between rich and poor societies. In high wage economies, money will be invested in minimising the hours of labour used to provide goods and services. This consumes fuel and equipment to replace the need for someone to work. In unimproved poor communities, very little equipment is used, goods are transported as head loads, bricks are made using crude wooden moulds, flour ground by physical pounding.

Intermediate Technology introduces equipment which provides a step up from traditional methods. Bricks are made more quickly and accurately by a mechanical hand press, goods are transported by energy efficient carts or even by simplified railway.

### The ITW Approach

- ◇ Understand the problem to be tackled by engineering intervention
- ◇ Search to be sure that no effective solution is already to hand
- ◇ Ensure that talented collaborators are available
- ◇ Conceive the form and function of the solution so as to determine a specification
- ◇ Draw on traditional and contemporary parallels so as to conceive and formulate proof-of-concept functions dealing with each component in turn

- ◇ Assemble into proof-of-concept samples or test rigs
- ◇ Test, modify, test again until the specification appears possible to meet and sustain
- ◇ Develop a prototype 'first of class' machine or system, test and demonstrate through exploitation by 'first adopter' customers
- ◇ Draw up cost-and-benefit profiles for wider exposure and initiation of licensing negotiations.

### Project No.1 Low Carbon Bus

Throughout the world and in particular congested tropical cities the highest element of cost for the operators is diesel fuel. The typical small bus called 'Matatu' in Kenya or 'Dala Dala' in Tanzania carries around 30 passengers and is used extensively to bring workers from the suburbs to the city. A typical journey in today's circumstances of heavy traffic congestion could involve a 4 hour round trip with stop-start driving which is very inefficient in use of fuel. Although running normally the vehicles could travel as many as 20 km on a gallon of fuel, during urban journeys consumption could be 2 or 3 times higher.

ITW in association with Parry People Movers will offer to receive a donor vehicle from an overseas operator and convert it to flywheel hybrid operation. Returned to normal use the operators will be able to assess just how much fuel can be saved by installing a car sized engine plus a flywheel. Acceleration will be as good as with the original large engine. Further fuel is saved by energy recovery during braking and descent of hills, and when the vehicle is crawling in slow moving traffic the engine can just 'tick-over' and, being small, will use little fuel.



*PPM can go off the rails with a new bus 20 minutes of operation can be performed using the stored energy in the spinning flywheel. (Free energy recycled from brakes)*

Once convinced by operating the demonstrator in normal service that substantial savings are possible the operator will be offered local arrangements for the conversion of the rest of his bus fleet to the flywheel hybrids. UK business will follow supplying complete modules incorporating the new driveline for installation in existing buses. A further business will be sought working with local bus manufacturers for new vehicles to be supplied with similar low carbon traction equipment.



### Project No 2 Affordable Elevated Light Rail Infrastructure

Enquiries from private companies and public bodies in Ghana, India and Nigeria seek the means for introducing public rail transport which does not take up road space. This is particularly desirable at 'pinch-points' where road traffic occupies all available space and it's not possible to produce a clear way through. The enquiries frequently speak of 'mono-rail' systems, but these are not suitable to provide passenger boarding points at ground level. Where there is more space available the line should be able to run at grade like normal tramway. The secret to making elevated sections more affordable is to reduce the weight of the rail vehicles that run along them.. ITW is in touch with lightweight structure specialists who can develop an ultra-lightweight version of the successful Parry People Mover light railcar. The most promising source of funding will come from developers of new estates at the periphery of congested cities. Based on the expectation by residents of quicker, more convenient journeys, developers can feel confident about the prospect of being able to sell their new housing units at a higher price because of the tedium and discomfort of bus journeys in congested traffic.



*Elevated railways do not always require massive concrete beams. A roller coaster is actually a form of railway with kinks included for excitement. Photo from PPM's collaborators WGH Ltd of Doncaster.*

### Project No 3 Rapid to Construct High Quality Public Buildings

As described earlier in this newsletter, 2014 has seen the emergence of a particularly lethal virus infection (Ebola) in West Africa. This calls for clinics and larger medical centres to be constructed very rapidly to a very high standard of internal finish so as to be possible to maintain a strict level of hygiene. ITW through its association with Parry Building Products, can arrange areas of raised platforms on to which prefabricated flat-pack sections of high tech materials can be assembled into suitable accommodation for medical services to operate> It is believed that the international community will respond to the availability of these facilities in their efforts to contain the spread of Ebola or other future epidemics.

*Shell of a 100 bed isolation hospital built in six weeks*