

# ON THE MOVE

The Newsletter of PBR International Limited

May 2006



## 3 | PBR joins Ford elite

### Inside this issue: (click on links below)

Technical Paper "Among the most outstanding"	2	GM concept car incorporates PBR By-Wire technology	4
Successful Chevrolet Tahoe launch	3	Stainless steel braided performance	5
PBR joins Ford elite	3	New test equipment improves capacity	5
Regionally focused for growth	4	New face for USA	6
		Oz industry update	6

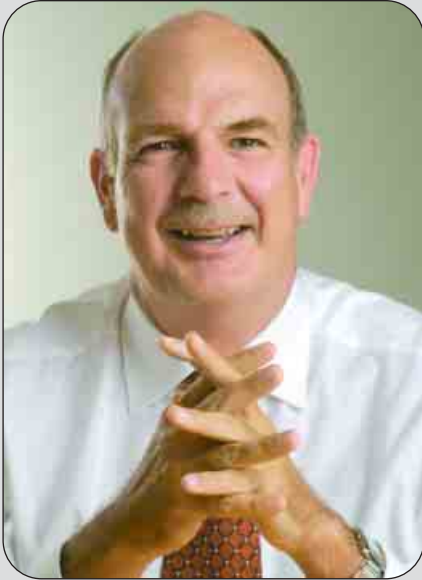


GM concept car incorporates PBR By-Wire technology

4

Want to know more? Join us online [www.pbr.com.au](http://www.pbr.com.au) or click here to subscribe to [ON THE MOVE](#)

## Introduction



John MacKenzie  
Managing Director

Welcome to the latest edition of *On The Move*. At a time when the global automotive industry is undergoing significant change it is pleasing to note that PBR has been able to rise to the challenge and achieve some notable successes.

It is with much pride that we can announce the receipt of two Ford supplier excellence awards which is a testimony to the ongoing ability of our global team to provide high levels of service and quality to our customers.

The release of General Motor's GMT900 program, spearheaded by the Chevrolet Tahoe, has been particularly pleasing with extremely positive feedback on the performance of our brakes.

Our engineering team has once again proved their value to the industry with their technical paper on 'brake noise'

receiving accolades from the Society of Automotive Engineers and subsequently going into print for the benefit of the broader engineering community.

In China, our manufacturing effort has received a further boost through the establishment of a business development office in Shanghai which will provide local support to our customers on new contracts.

As we move through 2006, PBR will continue to put in place the foundations which will provide the platform for future growth and long term benefits for our customers.

We hope you enjoy reading this latest issue.

John MacKenzie

## Technical paper "Among the most outstanding"

A technical paper presented by PBR engineers to the Society of Automotive Engineers (SAE) International has been judged "to be among the most outstanding SAE technical papers of 2005..."

The paper, entitled "An investigation of in-plane vibration modes in disc brake squeal noise" was written by Dr Antti Papinniemi, Dr Jiye Zhao and Daniel Stanef of PBR's NVH Group. It was presented at the 2005 SAE Brake Colloquium.

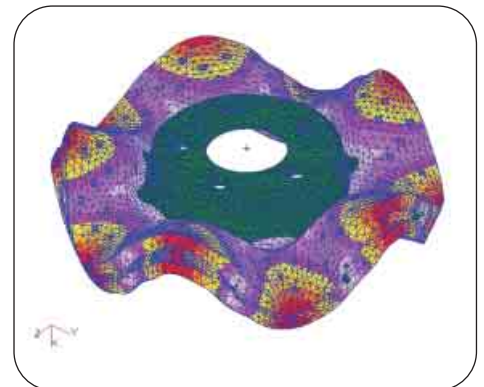
Having been judged as outstanding, the paper will now be published in "SAE 2005 Transactions", a highly respected resource for engineers all over the world.

PBR's engineering team is committed to presenting papers of excellence to global automotive engineers so that the broader industry can share in any significant

discoveries made by PBR in the area of brake system design.

In this particular paper, the authors noted that brake squeal does not affect mechanical performance, but impacts significantly on customer satisfaction and warranty costs.

They investigated ways of reducing squeal noise at high frequency, and carried out a design study to investigate how various rotor designs would reduce the noise. Alternative designs were investigated using simulation before prototypes were manufactured and tested. The noise test results of the proposed designs were found to be in accord with the predictions from the design study. The design modification was then introduced for production and customer feedback has demonstrated that this countermeasure is very robust.



An FEA simulation of the brake rotor during resonant vibration.

SAE International's recognition of the outstanding quality of this paper is testimony to PBR's ability to reduce noise and vibration in brakes.

## Successful Chevrolet Tahoe launch

The launch of the General Motors Chevrolet Tahoe has marked a successful engineering program by PBR. The Tahoe is the best selling full size SUV in North America and for the first time, this platform uses PBR designed and built front and rear calipers and Banksia park brakes.

The Tahoe is the first variant of several vehicles stemming from the GMT900 platform, all of which will use PBR braking

components. Its successful launch is encouraging for PBR who manufactures the foundation brake system for the vehicle at their Knoxville Tennessee production facility.

Prior to the GMT900, its predecessor, the GMT800, used the Delphi designed/PBR built front calipers. The new PBR cast iron front calipers have been designed with increased stiffness for improved pedal feel and decreased drag levels.

PBR's engineering team has committed more than 25,000 hours to the program which has been rewarded with early motoring reviews of the brakes rating them as excellent. Most notable has been the significantly improved pedal feel. In recent articles released through the Detroit Free Press the PBR brake system's performance was reported as "firm and providing good feedback".

**The reduction in brake drag has been a huge plus for the Tahoe...**



*Chevrolet Tahoe*

The reduction in brake drag has been a huge plus for the Tahoe especially with the increasing customer focus on fuel efficiency. The upgraded braking system is a key selling point of the car and is listed as one of the most immediately obvious differences between the new GMT900 platform and the outgoing models.

Other GMT900 family members that will follow closely behind include new versions of the Chevrolet Suburban and the GMC Yukon XL.

## PBR joins Ford elite

PBR was ushered into a family of elite suppliers to Ford Motor Company when they received a Silver World Excellence Award on 3rd May 2006.

More than 150 of Ford's largest suppliers from 17 countries were present at the Henry Ford Museum in Dearborn to witness the event.

The World Excellence Awards recognise suppliers who not only achieve the highest levels of cost, quality and delivery but who also embrace the vision to build on Ford's legacy and drive innovation to new heights.

**It is the second time PBR has received a Ford silver global award**

the Gold Supplier Excellence Award. It is the second time PBR has received a Ford silver global award since the inception of these awards eight years ago.

PBR is a longstanding brake system supplier to Ford Australia and supplies brakes to Ford vehicles in North America, Thailand and Europe.



*PBR's Derek Hodgson (centre) accepts the World Excellence Award from Ford's Tony Brown (Senior Vice President, Global Purchasing) and Richard Parry-Jones (Group Vice President, Global Product Development & Chief Technical Officer).*

The silver global award comes hot on the heels of PBR's success at Ford Australia's recent awards ceremony where they received

## Regionally focussed for growth

As PBR consolidates its Asian manufacturing base in China, Thailand and Malaysia, the timing is perfect to establish a global senior management team with a clear focus on regional activities.

For some time now PBR has been developing a global manufacturing footprint that facilitates local manufacturing support to vehicle manufacturers. PBR currently operates 12 manufacturing plants across Australia,

North America, Europe and Asia which are supported by a sophisticated PBR-developed manufacturing standards infrastructure known as GMS (Global Manufacturing Systems).

GMS is the key functional tool which ensures that PBR's customers are protected in terms of delivery, cost and quality.

PBR's focus now is to provide direction at a regional level to ensure that there

is a clear understanding of regional issues and opportunities as the company moves forward. To facilitate that process, the following regional company heads have been appointed to drive growth in each of the key regions. The aftermarket business will be managed with a global focus to ensure that cross regional opportunities are realised.



From left: Mr Peter Culley – Managing Director PBR Australia; Mr Vince Joy – Managing Director PBR Asia; Mr Paolo Buriasso – Managing Director AP Italia (Europe); Mr Derek Hodgson – Vice President PBR USA; Mr Phil Robinson – Managing Director Global Aftermarket.

## GM concept car incorporates PBR By-Wire technology

GM's concept vehicle, the Sequel, was predominantly developed to showcase advances in hydrogen fuel cell technology. This project is part of a longer term vision to design and validate a fuel cell propulsion system by 2010 that is competitive with current internal combustion systems on durability and performance, and that ultimately can be built at scale affordably.

**PBR's eMB system is receiving growing interest amongst by-wire engineers...**

Whilst fuel cell technology may have driven the initial concept, of equal importance is that the Sequel also features by-wire technology including electromechanical brakes (eMB) developed by PBR.

PBR's eMB system is receiving growing interest amongst by-wire engineers as projects like

Sequel facilitate a more hands on experience of the benefits it offers over alternative products.

PBR's brake-by-wire program also encompasses the development of an electrically actuated park brake which incorporates the unique ePark® technology and has proven to be popular amongst by-wire engineers around the globe.



GM Sequel interior.



PBR's eMB under development.

## Product spotlight

### STAINLESS STEEL BRAIDED PERFORMANCE

As the demand for performance products in the replacement parts industry continues to grow the PBR Performance range has also expanded to include stainless steel braided brake hoses.

One of the trademarks of high performance brake systems is pedal feel. A high performance brake system should deliver a firm, responsive pedal feel and one of the easiest ways to achieve this is by replacing the standard rubber brake hoses with a full set of stainless steel braided hoses.

PBR already includes these high performance hoses in their brake upgrade kits however the new range of hoses caters for a much broader range of vehicles.



PBR Performance braided brake hoses are ADR7/00 approved and manufactured based on original equipment specifications so that location grommets are fixed rather than floating. Fixed location grommets are critical to ensure that the hose will never foul during full steering lock or suspension travel.

Further information regarding this and other PBR Performance products can be found at [www.pbrperformance.com.au](http://www.pbrperformance.com.au).

## New test equipment improves capacity

PBR's Research and Development Centre has recently made significant investments in new test equipment to improve the throughput of brake development programs.

### Torque Durability Machines

Four new, PBR-designed, Torque Durability machines were recently commissioned.

These rigs use repeated brake torque applications to simulate some of the extreme conditions of a brake caliper's service life. Such accelerated torque test schedules provide essential caliper durability information, which is used to test the robustness of all PBR caliper designs. An advanced control system was developed for these machines to provide optimal accuracy and repeatability of the testing.

A torque durability test can take up to 3 months to perform. With the large number of tests required, the demand on this type of test rig is high. The four new rigs significantly improve capacity to perform these tests.

The new generation of torque durability equipment offer significant improvements over the existing machines:

- Simpler part change-over, allowing faster turnaround of tests
- Better ergonomics, improving operator safety
- Significantly faster, increasing through-put of test work.

### Burnishing Rig

Further improvements in testing capacity were also achieved in the brake dynamometer area with the introduction of a new brake burnishing rig.

This rig has been specifically designed to condition or 'bed-in' brake components prior to further testing on other equipment. It uses a 185kW electric motor to reproduce the loading (mechanical and thermal) imparted by a vehicle on its brake components. A powerful refrigeration system allows the environment around the brake to be controlled down to -20°C to replicate cold weather climates. The cooling system also allows faster test cycle times.

The addition of this resource has reduced the test load on the three existing PBR performance dynos, allowing those machines to be dedicated to more complex brake testing work.

The new burnishing rig can also be programmed to perform other test procedures, potentially further increasing its functionality in the future.



Torque durability tests provide essential caliper information.



## Around the globe

### NEW FACE FOR USA

PBR USA's head office has recently moved into new premises in Auburn Hills, Michigan. This facility provides both engineering and commercial support to the North American customer base.

Engineering capabilities include product design and development, prototyping and lab testing.

The new location details are:

#### **PBR International USA Ltd.**

1797 Atlantic Boulevard  
Auburn Hills, Michigan, 48326, USA

Telephone: 248-391-8900

Facsimile: 248-391-1474



### NEW SHANGHAI OFFICE IMPROVES ASIAN FOCUS

To support PBR's long term focus on increased activity in Asia, a regional office has been established in Shanghai. This move follows the recent establishment of two major manufacturing facilities in Dalian, China and the expansion of PBR's facility in Thailand.

Shanghai is a key hub in the Asian automotive region providing ready access to the largest local manufacturer, Shanghai Automotive, which has joint venture activities with VW and Shanghai GM. It also provides access to many local automotive component suppliers.

The Shanghai office will be headed by Mr Vince Joy, Managing Director, Asia, who will relocate to Shanghai later this year.

As a regional centre, the Shanghai office will be the focal point for all PBR's customers in the region providing local customer and application engineering support. This regional office will also be responsible for all Asian manufacturing facilities including activities in China, Thailand and Malaysia.

Dr Jiye Zhao, Business Development Manager, is currently leading the

establishment of the new office, including the recruitment of local engineering staff, in advance of Vince Joy's relocation.

Contact details for PBR's Shanghai office are:

Room A, 26 Floor, Times Square,  
No 500 Zhangyang Road, Pudong District,  
Shanghai China 200122

Tel: +(86) 21 58367601

Fax: +(86) 21 58367606



## Oz industry update

Record petrol prices appear to be a significant contributor in the recent slowing of the Australian automotive market as light vehicle sales continue to grow at the expense of large vehicles and an influx of motorcyclists return to Australian roads.

The latest figures released by the Federal Chamber of Automotive Industries (FCAI) show that year-to-date the motor vehicle

market is now running 10,724 vehicles or 3.4 per cent behind the same period in 2005.

Against the general downturn in the Passenger Vehicle Market, sales of the Light car segment are up 21.1 per cent YTD.

Sales of Sports Utility Vehicles are down 10.1 per cent YTD with only the luxury end of this market segment experiencing positive sales growth.

With four successive years of record sales growth preceding 2006, it was always going to be tough to continue the momentum. The FCAI shares this view which is reflected in their current sales forecast for 2006 of 980,000 vehicles compared to last year's record year of 988,269.