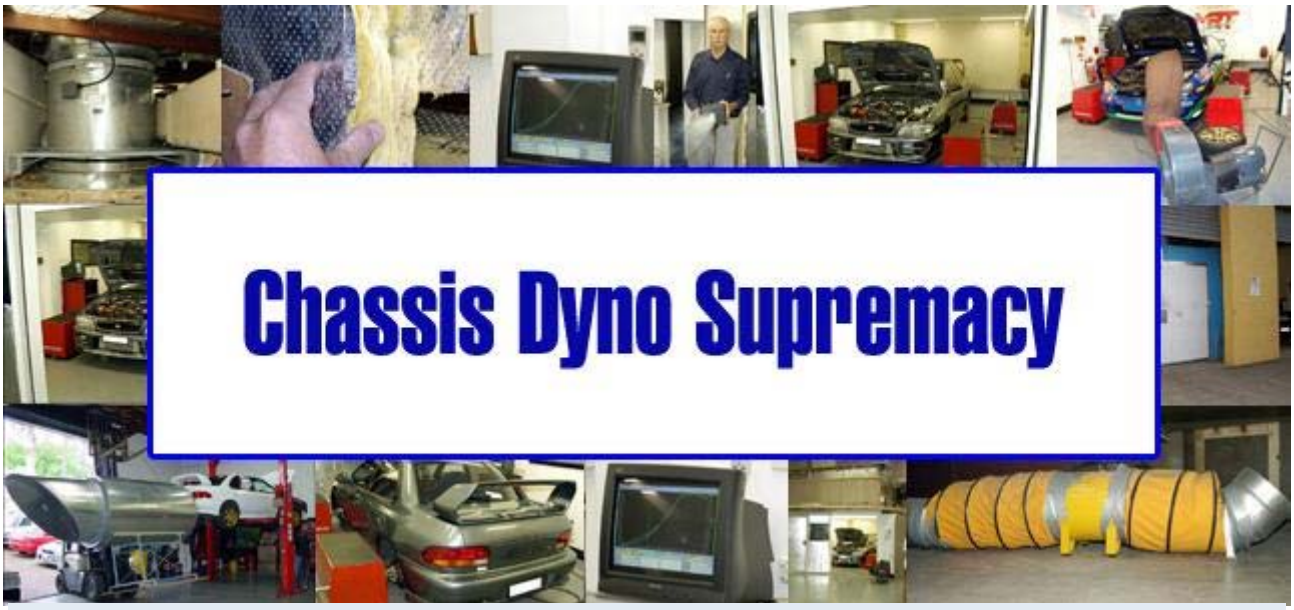

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Chassis Dyno Supremacy

We take a look at one of the best chassis dyno rooms in Australia.

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At a glance...

- A look at one of Australia's best chassis dyno facilities
- Cooling and ventilation
- Noise suppression
- Dyno software and data acquisition

A chassis dyno is essential for today's go-fast workshops. Stroll into even the most daggy-looking workshop and you'll likely find a set of rollers tucked away in a corner.

But are all chassis dyno facilities much the same?

Not by a long shot!

In this article we'll take you inside one of Australia's best dyno facilities and look at what puts it above the Daggsville dyno...

Why are Chassis Dynos So Important?

Chassis dynos are important for several reasons.

A chassis dyno is extremely useful for testing the effectiveness of vehicle modifications. It's a near-ideal environment to perform back-to-back comparisons of different camshafts, turbochargers and just about any engine upgrade you can mention.

A chassis dyno is also a great place to hold an engine at a specific load/rpm site to perform engine management tuning.

Chassis dynos are also commonly used for fault-finding and speedometer calibration.

Cooling and Ventilation

Putting a car through its paces on a chassis dyno requires a massive amount of cooling airflow and exhaust gas evacuation. These are fundamental for safe and effective dyno operation.

For an example of a spare-no-expense cooling and ventilation system, take a look at the newly built dyno facility at Sydney's Middleton Rally Team (MRT).

Brett Middleton from MRT says the cooling fan used in many Australian dyno facilities is often way too small; nowhere near big enough to keep radiators, intercoolers, oil coolers, drivelines and dyno retarders cool. As a result, the MRT dyno facility employs a mammoth 25kW 40,000 cfm fan which is installed above the ceiling of the dyno room.

This fan is so powerful it had to be installed on sprung mounts to reduce the amount of vibration transmitted through the rest of the building... The volume of airflow from the fan can be adjusted using a variable frequency controller inside the dyno room but, generally, it is run flat-out. You can never have too much cooling airflow.

The MRT cooling fan is configured to suck air through the dyno room. Air is drawn from the adjoining workshop into the dyno room through an opening in the ceiling at the front of the room. At the opposite end of the room you'll find a collector at floor level. This collector connects to a passage that leads back toward the front of the room (along the top of the ceiling) and into the main fan. The fan draws air from the dyno room and expels it to atmosphere through a giant silencer (which we'll discuss in the next section).

A second fan – a relatively small exhaust gas evacuation fan – is also fitted inside the air exit passage at the back of the room. As seen in this photo, the evacuator fan is connected to a length of spiral-wound tube and high-temperature silicone pipe (which is necessary to cope with EGTs). The tube and evacuator fan assembly draws air from the room and expels it near the entry of the main fan. The evacuator fan operates as soon as the dyno room lights are switched on (for health and safety purposes). Brett says the evacuator fan also helps minimise soot that would otherwise clog the main fan.

Interestingly, MRT has also tested the airflow pattern through the dyno room using a smoke machine. In the room's current configuration, the majority of airflow tends to travel along the floor rather than providing equal flow distribution across the front of the car. Still, the huge volume of airflow means there are no problems with car overheating. If necessary, a deflector plate can be used to guide cooling air into the radiator of very high-powered cars.

In addition to the main dyno room fan and evacuator fan, MRT uses a smaller capacity fan with a woven sock to blow air through top-mount intercoolers. This fan and sock ensure stable intercooler temperatures during consecutive high-load runs – something that's very difficult to achieve with, say, a Subaru WRX.

Dyno Room Construction and Safety

The huge amount of airflow through the MRT dyno room causes considerable load on the structure of the room. This has necessitated some interesting engineering...

Brett Middleton was amazed to find that the original wooden escape door split under the load caused by the main fan. The solution has been to fit a steel escape door along with an ultra strong steel framed vehicle entry door. You'll also find double-layer glass windows installed on rubber mounts (to prevent vibration-related cracking) and the grilles on the fluorescent lights have been glued on (to prevent them dislodging under fan pressure).

To enhance safety, the MRT dyno room has an emergency shut-down button than kills power to the main cooling fan, dyno and all related equipment. A newly installed electro-magnetic lock on the escape door is also opened to allow quick escape - Brett explains that opening the escape door was previously very difficult if the main cooling fan was spinning. The room is also fitted with large capacity fire extinguishers and video cameras which enable remote monitoring.

Noise Suppression

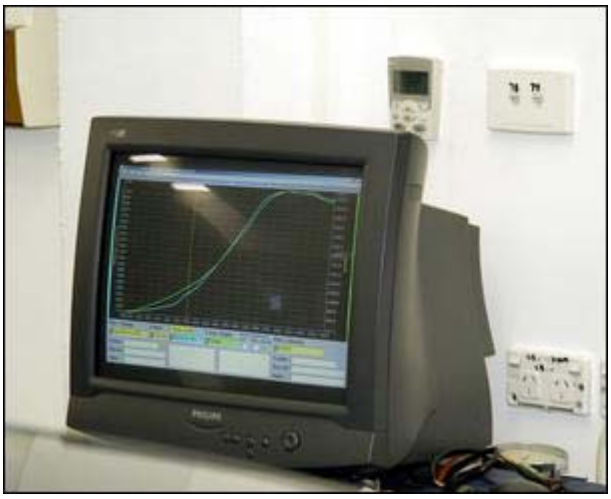
Noise suppression is another area that distinguishes a leading dyno facility. For effective noise suppression, it is essential that the chassis dyno is contained in a dedicated room that's heavily lined with sound insulation.

The MRT dyno room is built with walls that comprise three layers of fire-proof Gyproc with high-density acoustic foam filling the gaps. The density of the wall filling is critical in reducing transmitted sound. The vehicle entry door also uses triple layers of Gyproc which sandwich 50mm thick acoustic foam.

The air inlet passage is built from sturdy 15mm ply (which is unlikely to resonate) and features acoustic lining on the inner walls. The entry to this passage also incorporates a baffle arrangement to reduce induction noise heard in the workshop. On the outlet side of the fan there's an insulated 90-degree bend that connects to a gigantic silencer before exiting to atmosphere. Brett says this silencer alone (as seen here) cost around AUD$5000!

Dyno System and Data Acquisition

MRT uses a DynaPack dyno that requires removing the car's wheels and bolting the separate dyno heads to each driven hub. The DynaPack hub dyno can accommodate two or four-wheel-drive vehicles. Compared to a conventional chassis dyno, the hub-type dyno eliminates the chance of tyre slip. The problem of tyre temperature and pressure variation is also eliminated which makes it ideal for long-haul tuning sessions. The biggest downside is typically a more time-consuming set-up. For details on the DynaPack dyno see The Dynapack Dyno



MRT uses the supplied DynaPack software to graph power and torque at the hubs, boost pressure, predict vehicle acceleration, plot air-fuel ratio (using MRT's five-wire UEGO sensor) and its configurable to accept inputs from various sensors and probes. Data can also be obtained using stand-alone equipment (such as a fuel flow/pressure gauge) and Subaru and Mitsubishi-specific EcuTeK software.

And what's the cost of using this state-of-the art dyno room and equipment?

Well, MRT currently charges AUD$220 per hour for use of the dyno – and that includes all data acquisition equipment and professional labour.

If you find yourself being charged more than AUD$200 per hour at a dyno facility that doesn't look *anything* like this, it is certainly worthwhile investigating the facilities that are offered in other local workshops. Like we said, not all dyno facilities are the same...

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