

## Sir Charles Court owner Colin Cave

This is the first full battery powered electric free hand prototype to join the Castaldare locomotive shed. The locomotive has evolved over the past 3 years to become a very efficient fully powered unit. The locomotive joined CMR in July 2008.



*Mr Colin Cave pictured astride his locomotive Sir Charles Court July 2008*

### Power

4 X 12 volt 200 amp/hour deep cycle traction batteries connected in series parallel creating a 24 volt 400 amp/hour battery pack.

4 X 500 watt 24 volt 2500 RPM permanent magnet motors. With 2 mounted on each bogie.

Speed control is a home brew 5 kW pulse width MOSFET chopper. This supplies more than enough power to pull in excess of 5 full length fully loaded wagons under all conditions around the CMR network.

Battery charging is by a commercial 240 volt 10 amp to 24 volt 30 amp deep cycle battery charger/conditioner. Full recharge can be achieved over night.

### Drive Train

The motors are gear driven at a 1.25 : 1 ratio to a 8 : 1 gear box mounted under and in the middle of each bogie. In turn the gear box is chain driven at a ratio of 1 : 1 to each axle creating a ratio of 10:1.

**General**

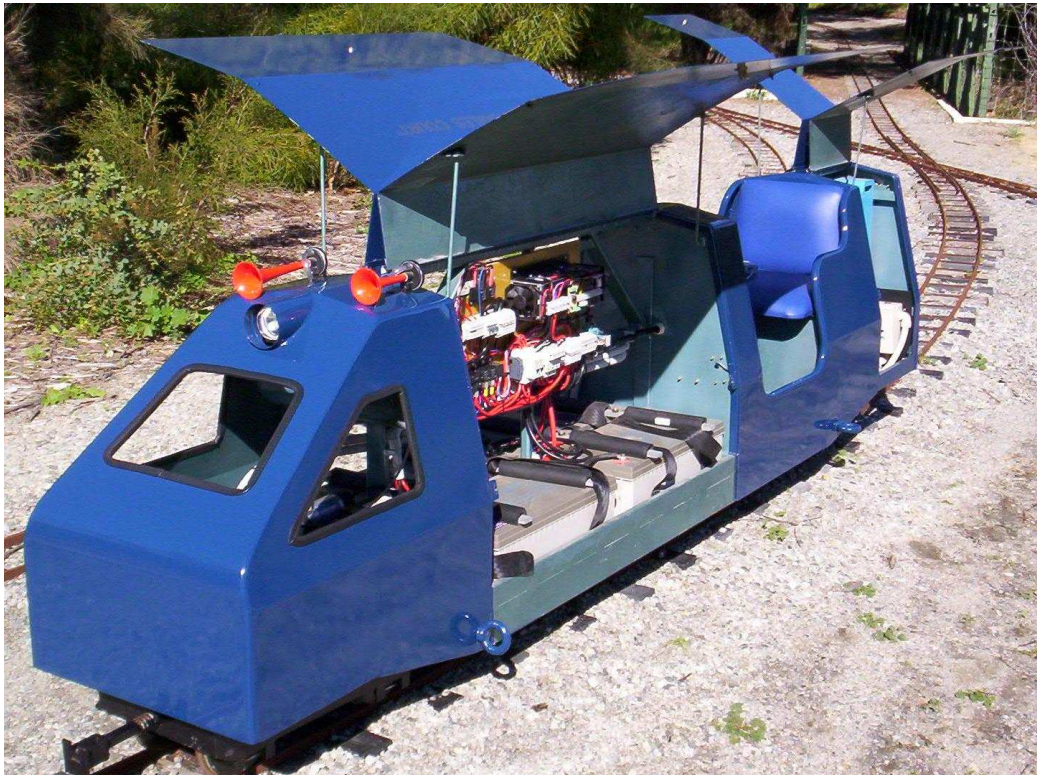
The locomotive weighs 600 kg without the driver.

8 kph is the top speed with a 10:1 gear ratio.

Acceleration at full power easily breaks traction on all wheels.

Battery power is available for 2 to 4 hours continuous operation then recharging is required. This is dependent on loading and speed.

The driver's controls are throttle, forward/reverse switch, air brake, Electric horns, light switch and battery charge indicator.



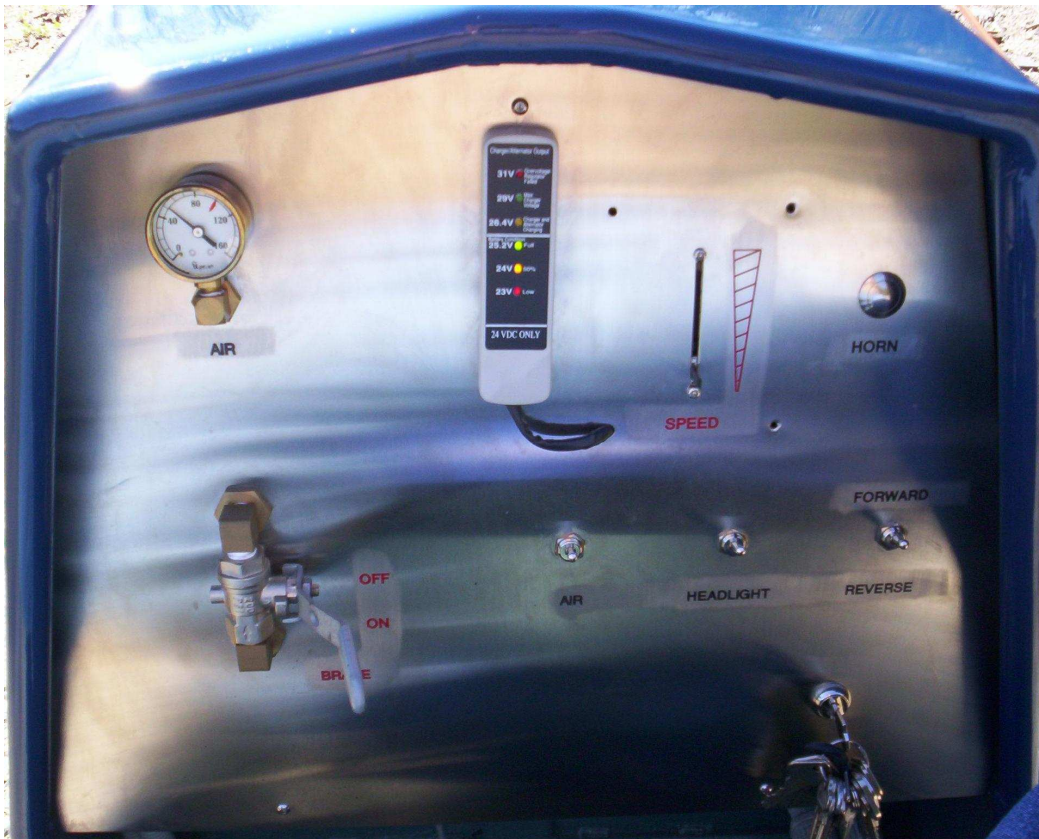
*Internal view with the covers up*

Two of the 4 batteries rated at 12 volt 200 amp/hours each, can be seen at the base of the power compartment. Above this are the relays, terminals and control gear. The battery re-charging unit is housed in the rear compartment along with the rear traction motors and air brake assembly.

The front nose section of the locomotive houses the two front traction motors, brake air compressor and electric horns, air compressor along with the 24 to 12 volt converter.



*Dead Man's (red) and Dynamic Brake (black) Buttons, resting on the drivers seat.*



*Drivers controls*

Instrument control cluster above shows the air reserve pressure gauge, battery condition indicator, throttle (speed), horns, air brake lever, air compressor, headlight forward and reverse switch along with the key operated isolation switch.



*Locomotives Rear view*

The tear drop shaped cover on the rear is the location of the battery chargers mains power plug. Charging is via a standard 240V 10A outlet (GPO).

The train brake air coupling had not been fitted when this picture was taken.

The locomotive is a very comfortable and spacious experience for the driver; in full operation it sounds just like its full size electric counter parts with the normal hum of the traction motors and the gear noise created by the drive train assembly.

Operation is very smooth with more than enough power to manage the most demanding tasks.

Colin has named his locomotive after Sir Charles Court (dec). He was the 21<sup>st</sup> premier of Western Australia from 1974 to 1982. He was instrumental in encouraging Colin to move to Perth to set up an engineering business.