



SQNLDR Dave Cugley  
Department of Defence  
Brindabella Park

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1. Amberley Modifications Letter Ver 2.doc  
IN90209

Dear Dave

### **Heavy Roller Options Study - Review of RAAF Amberley Roller Modifications**

SKM has been engaged to undertake a study into the options for the disposal or transfer of ownership of the Defence heavy roller fleet. Part of that study includes the review and assessment of the modifications made to the roller hired to Leighton Contractors for use in the RAAF Base Amberley Stage 2 Redevelopment, Multi Role Tanker Transport (MRTT) project.

This letter details the findings of this element of the study.

### **RAAF Amberley Roller Modifications**

The heavy roller hired to Leighton Contractors for the MRTT project was inspected by SKM staff on 12 April 2006. The roller was located at Leighton's plant depot at Darra (Brisbane). A photographic record from the inspection is included in **Annex A**. A general view of the roller is shown in **Photograph 1**.

The roller was inspected with Leighton's workshop manager. The items of work undertaken as part of the modifications included the sourcing and fitting of alternate tyres as well as general maintenance to various elements of the roller. The actual upgrade works performed included:

- The six bushes for joining the two roller halves were replaced with hardened steel (**Photograph 2**).
- A new axle was fitted as the existing axle was buckled (**Photograph 3**).
- The existing hubs were cut out of the existing wheels and fitted to new wheels (**Photograph 4**).
- New wheels (rims) were manufactured and fitted to accommodate the change in tyre size (**Photograph 5**).



- New tyres (Bridgestone Industrial Service 16.00-25 32 Ply YS2) were purchased and fitted (**Photograph 6**).
- New bearing were installed to all hubs.
- Two of the wheels were swapped so that the larger hubs were on the outside as this would provide greater resistance to cornering stresses by having the larger hubs located on the outside of the roller.
- The rear flanges were straightened (**Photograph 7**).
- The draw-bar pin was replaced with hardened steel (**Photograph 8**).
- Minor rust was treated with rust inhibiting paint.
- Some steel plates were replaced where the existed plates presented a cut hazard (**Photograph 9**).
- The roller was painted.
- Four new tyre inflation instruction plates were fitted (**Photograph 10**).

The tyres purchased by Leighton's were supplied by Bridgestone and are forklift tyres. Discussion with a tyre consultant suggested that other earthmoving tyres would also be suitable but were unavailable at the time of purchase. The tyres currently fitted have the following capabilities according to Bridgestone's technical data sheets:

- Inflation pressure. 1000 kPa.
- Load per wheel (at 10 km/h). 16,875 kg.

The tyres fitted to the roller by Leightons are significantly squarer in profile than the original roller tyres. This may lead to increased shear stresses induced by the walls of the tyres and this has the potential to lead to shearing of pavement layers not experienced with the original roller configuration. Only through site trials will this issue be quantified.

The costs incurred by Defence (through Leighton's) to upgrade this roller are not yet finalised. Discussion with the workshop manager indicated that the costs were expected to be in the order of \$40-50 k. Leightons will provide an accurate cost for the works when the upgrade costs are recovered from Defence.



## **Tyre Pressure – Maximum Mass Relationship**

For the Defence heavy roller fleet, the Heavy Roller Operations Manual provides relationships between any given tyre pressure and the maximum allowable operating mass at that tyre pressure. As the tyre pressure increases, the allowable mass also increases. This relationship should be obtained from the tyre manufacturers for the newly fitted tyres to allow appropriate maximum masses to be utilised where sub-maximal tyre pressures are required.

Should you have any queries regarding this letter or require further information, please do not hesitate to contact the undersigned.

Yours sincerely

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Annex:

A. Photographic Record.

## **ANNEX A**

### **PHOTOGRAPHIC RECORD**



**Photograph 1. Overview of Roller.**



**Photo 2. Replaced hardened steel bushes.**



**Photograph 3. Replaced axle.**



**Photograph 4. Existing wheel hubs.**



**Photograph 5. New Wheel Rims.**



**Photograph 6. New Bridgestone 16.00-25 32 Ply YS2 tyres.**



**Photograph 7. New rear flanges.**



**Photograph 8. Replaced hardened steel draw-bar pin.**



**Photograph 9. Replaced steel plates.**



**Photograph 10. New tyre inflation instruction plate.**