



Australian Government

AURTTM002 Repair bearing tunnels and connecting rods in engines

Release: 1

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Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to repair bearing tunnels and connecting rods in engines. It involves preparing for the task, line boring and honing engine bearing tunnels, repairing connecting rods to specifications and workplace requirements in an engine reconditioning process, and completing workplace processes and documentation.

It applies to those working in the automotive service and repair industry. The engine components include those in vehicles from all sectors of the industry.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Competency Field

Mechanical Miscellaneous

Unit Sector

Technical - Manufacture

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.

Elements Elements describe the essential outcomes.	Performance Criteria Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section.
1. Determine line boring requirements	1.1 Job requirements are determined from workplace instructions 1.2 Engine block is cleaned and main bearing bolt holes are crack tested according to workplace procedures and safety requirements 1.3 Information is sourced and repair options are analysed and those most appropriate to the circumstances are selected 1.4 Required tools and measuring equipment are checked and prepared for operation according to manufacturer specifications and workplace procedures 1.5 Hazards associated with the work are identified and risks are managed
2. Prepare engine and line boring machine	2.1 Engine is measured and <i>calibration requirements</i> for line boring are determined 2.2 <i>Engine block or cylinder head is prepared</i> for line boring according to workplace procedures and <i>safety and environmental requirements</i> 2.3 <i>Line boring machine is prepared</i> to accept cylinder engine block or cylinder head according to manufacturer specifications and workplace procedures 2.4 Engine block or cylinder head is <i>positioned and clamped</i> according to manufacturer specifications and workplace procedures
3. Line bore engine bearing tunnels	3.1 <i>Tool is set and locked</i> and a test cut is taken according to workplace procedures and safety requirements, and following machinery safe operating procedures 3.2 Engine tunnels are <i>line bored at correct speeds and feed rates</i> according to workplace procedures and safety requirements, and following machinery safe operating procedures 3.3 Line boring tool sharpness is checked and maintained throughout boring operation according to manufacturer specifications and workplace procedures 3.4 Engine block thrust faces and seal diameter are machined to original size 3.5 Tunnels are measured to ensure compliance with manufacturer specifications 3.6 Line boring operations are completed according to required <i>specifications and honing allowances</i> , workplace procedures and safety requirements, and following machinery safe operating procedures
4. Prepare to hone	4.1 Line-bored engine block or cylinder head is cleaned of residue and

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engine bearing tunnels	<p>swarf according to workplace procedures and safety requirements</p> <p>4.2 Tools and equipment for honing are selected and checked for serviceability</p> <p>4.3 Measuring and calibration requirements for honing are determined</p> <p>4.4 Honing machine is prepared to accept engine block or cylinder head according to manufacturer specifications and workplace procedures</p> <p>4.5 Engine block or cylinder head is positioned and securely clamped, and required hone stroke is set according to manufacturer specifications and workplace procedures</p> <p>4.6 Hone stones are selected and speed is set to achieve required finish</p>
5. Hone engine bearing tunnels	<p>5.1 Tunnels are honed at correct speed and rate to required finish according to workplace procedures and safety requirements, and following machinery safe operating procedures</p> <p>5.2 Components are measured to ensure compliance with manufacturer specifications</p> <p>5.3 Honing operations are completed to required tunnel to journal clearance according to workplace procedures and safety requirements, and following machinery safe operating procedures</p>
6. Prepare to repair connecting rods	<p>6.1 Connecting rods are <i>cleaned and checked for serviceability</i> according to workplace procedures and safety requirements</p> <p>6.2 Connecting rods are checked for straightness and straightened as required according to workplace procedures and safety requirements, and following machinery safe operating procedures</p> <p>6.3 Connecting rod boring machine is prepared to accept connecting rod</p> <p>6.4 Connecting rod is positioned ready for honing, and securely clamped if machining</p>
7. Repair connecting rod	<p>7.1 Connecting rod little ends and big ends are resized according to workplace procedures and safety requirements, and following machinery safe operating procedures</p> <p>7.2 Components are measured to ensure compliance with manufacturer specifications</p>
8. Complete repair process	<p>8.1 Engine block or cylinder head is thoroughly cleaned of residual honing oil according to workplace procedures</p> <p>8.2 Final inspection is made to ensure finished work complies with workplace requirements</p> <p>8.3 Bright surfaces are treated with rust prevention solution and engine</p>

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	<p>block or cylinder head is prepared for further process or storage according to workplace procedures</p> <p>8.4 Workplace documentation is processed according to workplace procedures</p>

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance and are not explicit in the performance criteria.

Skills	Description
Learning skills to:	<ul style="list-style-type: none"> locate appropriate sources of information efficiently.
Reading skills to:	<ul style="list-style-type: none"> interpret engine component specifications from manufacturer and workshop literature interpret machinery safe operating procedures from operating manuals and signs.
Writing skills to:	<ul style="list-style-type: none"> legibly and accurately fill out workplace documentation to record measurements.
Numeracy skills to:	<ul style="list-style-type: none"> interpret numerical information in manufacturer specifications, workshop literature, and machinery dials and gauges use basic mathematical operations, including addition and subtraction, to: <ul style="list-style-type: none"> convert metric dimensions to imperial, and imperial dimensions to metric calculate tolerances and clearances interpret numerical measurements on metric and precision measuring equipment.
Planning and organising skills to:	<ul style="list-style-type: none"> select best tooling option for the work and sequence procedure to reduce time and material wastage.

Range of Conditions

This section specifies work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Bold italicised wording, if used in the performance criteria, is detailed below.

<i>Calibration requirements</i> must include:	<ul style="list-style-type: none"> determining depths of cuts and required honing allowances determining tunnel to journal clearance.
<i>Preparing engine block or cylinder head</i> must include:	<ul style="list-style-type: none"> removing main bearing caps from engine block machining bearing cap and engine block parting faces fitting bearing caps to required tensions.
<i>Safety and environmental requirements</i> must include:	<ul style="list-style-type: none"> work health and safety (WHS), and occupational health and safety (OHS) requirements, including: <ul style="list-style-type: none"> procedures for: <ul style="list-style-type: none"> selecting and using personal protective equipment (PPE), including safety glasses, ear protection and safety footwear using hand tools and lifting equipment operational risk assessment and treatments associated with: <ul style="list-style-type: none"> electrical safety of line boring and honing machinery line boring and honing machinery movement and operation environmental requirements, including procedures for trapping, storing and disposing of cooling and lubricating fluids released during machining process.
<i>Preparing line boring machine</i> must include:	<ul style="list-style-type: none"> sharpening and shaping cutting tools identifying worn and damaged cutting tools mounting and positioning cutting tools correctly using clamps, jigs and rails.
<i>Positioning and clamping</i> must include:	<ul style="list-style-type: none"> setting work piece into line boring machine and aligning work piece to centre line of boring bar using appropriate and sufficient clamping of work piece.
<i>Setting and locking tool</i> must include:	<ul style="list-style-type: none"> setting tool to required diameter locking tool according to manufacturer specifications.
<i>Line boring at correct speeds and feed rates</i> must include:	<ul style="list-style-type: none"> using coolant and lubricant correctly setting machining parameters to achieve job requirements and maximise tool life setting speed and feed rates for tunnel material and diameter.
<i>Specifications and honing allowances</i> must include:	<ul style="list-style-type: none"> consideration of speed and feed and nose radius of boring tool.

<i>Cleaning and checking for serviceability</i> must include:	<ul style="list-style-type: none">• crack testing connecting rod• measuring little end and big end size• checking big end fitment in connecting rod.
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Unit Mapping Information

Equivalent to AURTTM3002 Repair bearing tunnels and connecting rods in engines

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>