Inspecting and maintaining Elevating Work Platforms

Guidance material

JANUARY 2021

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# Introduction

Elevating work platforms (EWPs) can pose a number of work health and safety (WHS) risks. A preventative inspection, maintenance and testing program will help ensure an EWP is safe to use. This guide provides information to a person conducting a business or undertaking (PCBU) on:

* inspection
* inspection types
* monitoring and testing, and
* recording and reporting.

## What are elevating work platforms?

EWPs are powered mobile plant designed to lift or lower people and equipment by a telescopic, hinged or articulated device, or any combination of these, from a base support. EWPs are generally of either an articulated or boom-type variety.

## Who should use this Guide?

This Guide has been developed to assist duty holders, primarily PCBUs, meet their duties and obligations under WHS laws. You should use this Guide if you or your workers operate, maintain, inspect or repair EWPs in a workplace.

## How to use this Guide

This Guide is intended to supplement other information available from Safe Work Australia to assist you to meet your duties and obligations under WHS laws. It should be read in conjunction with the following:

* [Model Code of Practice: *How to manage work health and safety risks*](https://www.safeworkaustralia.gov.au/doc/model-code-practice-how-manage-work-health-and-safety-risks)*,*
* [Model Code of Practice: *Managing the risks of plant in the workplace*](https://www.safeworkaustralia.gov.au/doc/model-code-practice-managing-risks-plant-workplace),
* Model [Code of Practice: *Construction work*](https://www.safeworkaustralia.gov.au/doc/model-code-practice-construction-work), and
* [Model Code of Practice*: Managing the risks of falls at workplaces*](https://www.safeworkaustralia.gov.au/doc/model-code-practice-managing-risk-falls-workplaces).

This Guide includes references to the legal requirements under the WHS Act and WHS Regulations. These are included for convenience only and should not be relied on in place of the full text of the WHS Act or WHS Regulations.

In this Guide, the word ‘must’ indicates a legal requirement that must be complied with. The word ‘should’ indicates a recommended course of action.

## Who has health and safety duties in relation to EWPs?

PCBUs have the primary health and safety duties in relation to inspection and maintenance of EWPs.

Officers of a PCBU must exercise due diligence to ensure their PCBU complies with its duties.

Workers and other persons at the workplace also have duties under the WHS Act, such as the duty to take reasonable care for their own health and safety at the workplace.

Persons conducting a business or undertaking

**WHS Act section 19**

Primary duty of care

**WHS Act section 21**

Duty of persons conducting businesses or undertakings involving management or control of fixtures, fittings or plant at workplaces

A PCBU must ensure, so far as is reasonably practicable, that workers and other people are not exposed to health and safety risks arising from the business or undertaking, including risks from EWPs.

This duty requires the person to eliminate risks to health and safety, so far as is reasonably practicable, and if it is not reasonably practicable to eliminate the risks, to minimise those risks so far as is reasonably practicable.

A PCBU also has a number of more specific obligations, which are set out in the WHS Regulations, including requirements to:

* manage the health and safety risks associated with plant
* prevent unauthorised alterations to or interference with plant, and
* use plant only for the purpose for which it was designed unless the proposed use does not increase the risk to health or safety.

Officers

**WHS Act section 27**

Duties of officers

Officers, such as company directors, have a duty to exercise due diligence to ensure the business or undertaking complies with the WHS Act and Regulations. This includes taking reasonable steps to ensure the business or undertaking has and uses appropriate resources and processes to eliminate or minimise risks from plant.

Workers

**WHS Act section 28**

Duties of workers

Workers have a duty to take reasonable care for their own health and safety and to not adversely affect the health and safety of other persons. Workers must comply with reasonable instructions, as far as they are reasonably able, and cooperate with reasonable health and safety policies or procedures that have been notified to workers. If personal protective equipment (PPE) is provided by the business or undertaking, the worker must, so far as they are reasonably able, use or wear it in accordance with the information, instruction and training provided.

Other persons at the workplace

**WHS Act section 29**

Duties of other persons at the workplace

Other persons at the workplace, like visitors, must take reasonable care for their own health and safety and must take care not to adversely affect other people’s health and safety. They must comply, so far as they are reasonably able, with reasonable instructions given by the PCBU to allow that person to comply with the WHS Act.

# Inspections

Thorough inspections are essential in ensuring parts of the EWP which are subjected to deterioration through wear, damage, corrosion and abrasion are repaired or replaced well before they fail. Regular inspections enable issues to be identified and rectified, so that you can be satisfied that an EWP is safe for your workers to use until the next inspection.

Details of observations during an inspection, including the nature of potential failures, are essential for planning maintenance, repair work and finding the cause of atypical failures.

You must ensure that inspections of EWPs are carried out by a competent person.

## When to inspect

There are numerous inspection types which should be carried out at different intervals. At a minimum, the WHS Regulations require inspections of an EWP to be carried out:

* in accordance with the manufacturer’s recommendations, if any, or
* if there are no manufacturer’s recommendations, based on a competent person’s recommendations, or
* if it is not reasonably practicable to comply with above, annually.

Further information on other recommended inspections is available in Part 3 – *Inspection types.*

Under the WHS Regulations, a designer of an EWP must give the manufacturer information about testing or inspections to be carried out on the EWP, if applicable. A manufacturer must ensure that such information is provided to any person being supplied with the plant. For EWPs that are imported, the importer must take reasonable steps to obtain this information and provide it to any person to whom the importer supplies the EWP and ensure that it is inspected having regard to the information provided by the manufacturer.

If there are no manufacturer’s recommendations, you should obtain recommendations from a competent person. Recommendations from a competent person should be based on relevant technical standards and take into account key causes of failure, such as the following:

* Components of equipment have a design life; that is, a period of time during which the item is expected, by its design, to work within its specified parameters. Life expectancy may not be directly related to calendar periods, but a combination of time, cycles and usage. Inspection intervals for most components are based on hours in operation which relates to the number of stress cycles the components have gone through.
* Many failures of components can be attributed to corrosion, wear, overloading, fatigue, or combination of these. Loose or missing fasteners, poor adjustment or inadequate lubrication can also contribute to failures. Items such as seals may have a reduced life when used infrequently due to lack of lubrication.
* It is essential to only operate the EWP within its rated capacity. A single instance of overloading can damage the EWP or lead to premature failure as overloading can reduce fatigue life.
* Road conditions and the distance travelled by vehicle mounted EWPs, or those that are transported on road, contribute to accelerated wear and tear of components.
* Frequency of inspections may have to be increased when operating in harsh conditions, for example corrosive, dusty, hot or cold environments.
* Older EWPs and those that are used more intensively or subject to harsh operating environments should be inspected more frequently and some components may need replacing more frequently than recommended by the manufacturer.

If inspection requirements are not met, the EWP should not be used until the PCBU is satisfied that an inspection has been undertaken.

Although it may not be necessary to inspect EWPs that are not being used, measures should be undertaken to protect the EWP from the environment during long term storage. Before returning the EWP to use, all safety and operating systems should be inspected and tested.

You must ensure that any safety issues identified through an inspection are rectified and the EWP is safe for your workers to use, before the EWP is used again.

## What to inspect

Exactly what an inspection should include will depend on the type of inspection being undertaken. Inspections must at least cover critical components and must ensure operational control and safety systems function as designed.

‘Critical components’ are the plant components whose failure or malfunction may affect the health and safety of persons using the EWP or who are in its vicinity.

Manufacturers normally provide recommendations for what an inspection should include, but if these are not available, recommendations should be developed by a competent person.

Inspections may include:

* identifying any modifications to critical components or systems that deviate from the manufacturer’s specifications
* identifying worn parts
* identifying damage to items like tyres, structural components and hydraulic hoses
* identifying abnormalities or defects—oils leaks, discolouration, cracks, unusual noises and vibrations
* checking fluid levels and greasing
* whether items or systems function as designed
* making adjustments as required
* replacing items or fluids as required—manufacturers may recommend replacing some items after a certain time period or hours of use irrespective of the condition
* identifying loose or missing components including safety critical fasteners
* undertaking written assessment of continued safe use, taking account of past and possible future use
* checking for any insulation damage (insulated EWPs)
* whether any manufacturers’ recommended safety upgrades have been completed, and
* whether data plates, placards and warning labels are in place and legible.

You must ensure that any safety issues identified through an inspection are rectified and the EWP is safe for your workers to use, before the EWP is used again.

## How to inspect

Inspections may include simple visual observations, functional testing, testing or measuring against acceptance criteria and identifying defects like damage or corrosion.

One method of inspection is no less important or effective than the other. For example, a visual pre-operation inspection could detect a crack on a structural member, or an oil leak, in advance of a more comprehensive routine inspection. This could prevent further structural damage or an adverse safety outcome in the meantime.

However, some items can only be inspected after dismantling, such as pins, bushes, wear pads inside telescoping booms, or internal areas subject to corrosion including joints between fibreglass and steel, gearboxes and brakes.

With any form of inspection there should be supporting documentation or information to guide the inspector on how to inspect the item and how to confirm that the component is in a safe condition.

## Who should take undertake inspections

You must ensure inspections are undertaken by a person who is competent to do so. A competent person is a person who has the necessary knowledge and skills to carry out the task, acquired through qualification, training or experience.

The competent person overseeing the inspection should:

* have sufficient knowledge to oversee, where necessary, other competent persons undertaking related specialist work, understand their reports including whether they contain necessary information
* have sufficient knowledge of the requirements for the model being inspected so that the inspection can be undertaken as required, and
* be aware of the relevant safety information including safety bulletins from the manufacturer and other safety publications. These should be incorporated into the inspection program and documented.

A competent person must be able to demonstrate that they possess these attributes.

# Inspection types

Generally, the following types of inspections should be undertaken:

* pre-operational inspection
* routine inspection
* periodic inspection, and
* major inspection.

## Pre-operational inspection

Pre-operational inspections are generally visual inspections and functional verification. These should be conducted at the beginning of each shift for obvious faults (anomalies) and to confirm the EWP’s correct functioning of controls and travel limits. These inspections should also include detection of damage, tyre pressures, fluid levels and leaks.

Pre-operational inspections must be undertaken by a competent person familiar with the operation of the particular model of EWP, for instance the EWP’s operator.

A list of typical items to be inspected during pre-operational inspections is included in Appendix A. This is not an exhaustive list. The items to be inspected should be based on manufacturer’s recommendations, where available.

You must ensure that any safety issues identified through an inspection are rectified and the EWP is safe for your workers to use, before the EWP is used again.

## Routine inspection

Routine inspections are normally based on usage and must be undertaken in accordance with manufacturer’s recommendations, if any. Routine inspections should be carried out at least every three months, unless the EWP is not in-service.

Routine inspections generally involve:

* dismantling some components to enable proper inspections
* removing covers of certain items
* review of logbook entries, for example, quality of previous records, identification of issues relating to pre-operational inspections or reasons for abnormal repairs
* availability of operator’s manuals
* condition of signage and decals
* lubrication and necessary adjustments
* function testing, and
* torque checking (critical fasteners).

You should ensure the competent person provides a written inspection report.

A list of typical items to be inspected during routine inspections is included in Appendix B. This is not an exhaustive list. The items to be inspected should be based on manufacturer’s recommendations, where available.

You must ensure that any safety issues identified through an inspection are rectified and the EWP is safe for your workers to use, before the EWP is used again.

## Periodic inspection

Periodic inspections are based on intervals of usage in hours subject to a maximum time period, typically one year. Periodic inspections must be undertaken at least annually, unless otherwise recommended by the manufacturer.

Components that are recommended to be inspected at intervals of more than 12 months, and which usually require a greater level of intervention, must be inspected at intervals recommended by the manufacturer, where available, or otherwise at intervals recommended by a competent person.

A list of typical items to be checked during periodic inspections is given in Appendix C. This is not an exhaustive list. The items to be inspected should be based on manufacturer’s recommendations, where available.

You must ensure that any safety issues identified through an inspection are rectified and the EWP is safe for your workers to use, before the EWP is used again.

## Major inspections

EWPs should be subjected to a major inspection for continued safe use after 10 years of service, and every 5 years thereafter.

EWPs should also be subjected to a major inspection if:

* the manufacturer recommends that it is due for a major inspection at earlier intervals
* the EWP is to be recommissioned or imported, and the previous operating records are not available
* the EWP is to be recommissioned or imported, and is designed or built to an unknown technical standard—in which case a design review should also be undertaken to ascertain whether the design meets minimum legislative requirements
* modifications have been made to the EWP which could impact on the safety
* the EWP has suffered damage that could compromise critical components or functions, or
* a competent person recommends it due to issues identified during other inspections.

Major inspections are not a substitute for other types of inspections but should be additional. Components subjected to a large number of stress cycles, such as structural members, require shorter inspection intervals. These components should be inspected during pre‑operational, routine and periodic inspections and not left until the major inspection.

The major inspection should involve:

* dismantling and examination of critical components (inspection of certain components may require a complete strip down and removal of grease and corrosion), and
* assessment and recording of the serviceability of each component or assembly.

A list of typical items to be checked is given in Appendix C. This is not an exhaustive list. The items to be inspected should be based on manufacturer’s recommendations, where available.

You must ensure that any safety issues identified through an inspection are rectified and the EWP is safe for your workers to use, before the EWP is used again.

# Monitoring & testing

In addition to pre-operational, routine and periodic inspections, EWPs should be monitored closely and tested against the manufacturer’s specifications or any relevant technical standards.

You must ensure any monitoring and testing of the EWPs is carried out by a competent person.

## Condition monitoring

Condition monitoring is the monitoring of a parameter, such as vibration or temperature. Changes to the magnitude of a parameter may indicate the condition of the item has worsened, while an analysis of data trends can assist in preventative maintenance scheduling.

Examples of condition monitoring include:

* Testing engine gearbox or hydraulic oil for metal particles to determine the condition of the mating parts. This information can be used to help schedule maintenance before the engine suffers a failure.
* Trends of vibration characteristics of bearings measured periodically to predict the remaining life of the item or if it is misaligned.

It may not be reasonably practicable to use condition monitoring in all situations.

## Non-destructive testing

Non-destructive testing (NDT) is a method of testing that includes ultrasonics, magnetic particle testing, acoustic or radiography that can be used to supplement other inspection techniques, for example visual inspection. NDT is used when:

* detecting cracks in welds and parent metal of welded components
* detecting cracks in fibreglass (insulated) booms
* measuring the wall thickness of components subject to corrosion or wear, and
* detecting cracks in pins and shafts subject to fatigue—particularly where there is a change in the geometry of, for example, the pin or shaft that may result in stress concentrations.

Not all NDT techniques are suitable in every situation.

NDT does not replace other types of inspections, for example looking for cracks during pre-operational or routine inspections.

Before performing NDT, it is important to establish the purpose of the testing. A competent person should identify the critical components and areas, the appropriate technique for testing, any test restrictions (for example lack of access, surface discontinuity due to poor weld profile, cutting or grinding), and the criteria for accepting an item as ‘safe’. Test restrictions should be remedied to allow for less restricted testing, if possible. The competent person who undertakes the NDT should record the results of every inspection performed.

NDT should also form part of the quality assurance process, which is commonly known as qualification of a repair, when appropriate.

# Recording & reporting

Detailed records of inspection, testing and maintenance must be kept for the period that the EWP is used or until you relinquish control of the EWP. Records should:

* demonstrate the PCBU has complied with their duties, particularly if the EWP was involved in an incident
* determine the trends and causes of premature or unusual failures
* determine the integrity of previous inspections, and, if necessary,
* schedule repairs and future inspections.

The records of premature or frequent failure of components may help identify the root cause of failures or whether the causes of premature failures have already been addressed.

It is recommended, and good industry practice, to share this information with the manufacturer to determine the best course of action and if any design changes need to be made on subsequently manufactured EWPs.

Each competent person involved in the inspection should provide a written report on completion of the inspection. Reports should be in writing and should include sufficient information:

* for the reader to understand the scope of work, the state of items and action taken or recommended
* to identify the critical components that have been inspected and the result of the inspections
* to confirm the work has been undertaken as required
* that supports conclusions—how the item was declared fit for use
* includes photos or sketches where necessary
* to facilitate further analysis to plan future work, and
* relating to future scheduled inspections—more frequent inspections or inspecting a specific part or system.

A written report should include:

* the name and signature of the competent person
* qualifications and contact details of the competent person
* the date and location of inspection
* inspection type (pre-operational, routine, periodic, major)
* owner/controller details
* manufacturer
* model number
* serial number
* hour meter reading
* date of manufacture or commissioning
* rated capacity
* date of inspection, and
* place of inspection.

Where it is not reasonably practicable to include all details of work undertaken in the record, the record should have:

* a brief summary of the work undertaken
* the date the work was completed
* hour meter and odometer readings
* a reference to the detailed report
* date of the report, and
* name and the signature of the competent person.

Copies of the records should be provided to the new owner or controller when ownership or control of an EWP changes.

Logbooks or an electronic logging system can be used for recording information about an EWP. Electronic recording systems should have an effective backup system against data loss.

Records should be kept in a readily accessible location and electronic records should be made available as required for use or inspection by you, your workers and any competent person conducting an inspection.

# Appendix A – Pre-operational inspections

This table provides useful information on items to be included in a pre-operational EWP inspection and a subsequent written inspection report by a competent person. This list is not exhaustive. You should consult the manufacturer’s or competent person’s recommendations for the EWP for the items to be checked.

|  |
| --- |
| Pre-operational checks |
| Visual inspection for signs of cracks, distortion or excessive wear |
| Adjustable components are within the recommended range |
| Operates smoothly |
| Controls return to off position when released |
| Clean and free of debris |
| Interlocks function as designed |
| No sign of fluid leaks |
| Decals, warning signs, operator manual and log books are in place and legible |
| Fluid levels are within specified range |
| EWP is properly lubricated  |
| Pin locking devices in place |
| Hoses and cabling correctly fixed |
| No loose wiring or connections |
| Tyres are inflated to the recommended pressure, or are solid tyres |
| Tyres are in good condition and without damage |
| Batteries are charged |
| Ground controls override platform controls |
| Emergency controls and retrieval system are operational |
| Integrity of guard rails and self-closing gates checked |
| **Pre-operational inspection reports should contain:** |
| Components to be inspected and function tested – indication that the components have been tested |
| Any defects identified and action undertaken  |
| Date of inspection and the signature of the competent person |

# Appendix B – Routine inspections

This table provides useful information on items to be included in a routine EWP inspection and a subsequent written report by a competent person. This list is not exhaustive. You should consult the manufacturer’s or competent person’s recommendations for the EWP for the items to be checked.

| **Component** | **Visual inspection** | **Functional test** |
| --- | --- | --- |
| Operator manual | y |  |
| Log-book | y |  |
| Structural defects | y |  |
| Tyres and wheels | y |  |
| Placards, warnings and control markings | y |  |
| Air, hydraulic or fuel leaks | y |  |
| Cables and wiring (security and damage) | y |  |
| Loose or missing components | y |  |
| Controls – base and platform | y | y |
| Control descent devices (where fitted) | y | y |
| Alarms – visual and audible |  | y |
| Emergency controls and retrieval system |  | y |
| Brakes |  | y |
| Slew brake function |  | y |
| Outriggers and stabilisers |  | y |
| Guard rails and self-closing gates |  | y |
| Safety switches and interlocks |  | y |
| Operation of drive functions |  | y |
| **Routine inspection reports should contain:** |
| Components to be inspected, and function tested – indication that the components have been inspected or tested |
| Any defects identified and action undertaken |
| Date of inspection and the signature of the competent person |

# Appendix C – Periodic & major inspections

Example of items to be checked during, periodic or major inspections.

These tables provide useful information on items to be included in periodic and major EWP inspections and a subsequent written report by a competent person.

This list is not exhaustive and may include items that are not relevant or fitted to the EWP. You should consult the manufacturer’s or competent person’s recommendations for the EWP for the items to be checked.

| **Items to be checked** |
| --- |
| Operation and safety manuals |
| Decals and warnings are secure and legible |
| Modifications |
| Condition of structure and welds |
| Fasteners, pins shield and covers |
| Hoods and gas struts |
| Stub axle |
| Turret |
| Manufacturer’s safety upgrades |

Function controls

| **Items to be checked** |
| --- |
| Platform controls |
| Ground controls |
| Function control detents |
| Guards for controls |
| Function enable control (deadman) |
| Emergency stop switches (ground and platform) |
| Function limit, cut out switches, interlocks and other safety devices |
| Manual descent or auxiliary power |
| Foot switch |
| Capacity limiter |
| Drive brakes |
| Slew brakes |

Platform

| **Items to be checked** |
| --- |
| Guard rails |
| Gates – self closing |
| Floor |
| Anchors for lanyard |
| Rotator |

Scissor mechanism

| **Items to be checked** |
| --- |
| Scissor arms |
| Arm safety stop |
| Cylinder pins, pivot pins and securing components |
| Arm pins, wear pads and securing components |

Chassis assembly

| **Items to be checked** |
| --- |
| Side compartment door assembly |
| Static strap |
| Wheel and tyre assemblies |
| Drive motors |
| Pothole protection system |
| Platform ladder |
| Wheel bearings |
| Oscillating axle lockout cylinder system |
| Outrigger or stabilisers |
| Extendable axle system |
| Drive hubs |
| Pedestal |

Boom assembly

| **Items to be checked** |
| --- |
| Boom welds |
| Hose and cable carrier installation |
| Sheaves and sheave pins |
| Bearings |
| Wear pads |
| Slew bearing or worm gear |
| Oil coupling |
| Slew drive system |
| Insulation inserts |

Power system

| **Items to be checked** |
| --- |
| Batteries fluid |
| Battery charger |

Hydraulic and electric systems

| **Items to be checked** |
| --- |
| Hydraulic lift/steer pump |
| Hydraulic cylinders (arms and steering) |
| Steer cylinder attachment pins and pin retainers |
| Hoses, lines and fittings |
| Hydraulic tank, cap and breather |
| Fluid |
| Oil filter |
| Electrical connections and wire looms are not loose |
| Instruments, gauges, switches and horn |

Periodic and major inspection report should include the reports of those providingadditional inspections or repair services, and documents reviewed.

|  |
| --- |
| **Periodic and major inspection reports should contain:** |
| Date of commencement of inspection |
| Date of completion of inspection |
| Component inspected |
| Inspection method for each component or assembly |
| Inspection criteria, result, status (acceptable/not acceptable) and comments (e.g. replace, repaired) |
| Details of repair, repair procedures, tests and replacements |
| Details of functional and other tests |
| Observations and recommendations relating to future maintenance and inspections |
| Contact details of the PCBU |
| Name of the competent person, their qualifications, contact details and signature. |

An assessment of remaining operational life can be applied to a component, an assembly or the whole plant. Increasing frequency of inspections will not improve fatigue life. A competent person should consider remaining operational life when establishing whether the plant should remain in service.

# **Appendix D – Example report of a periodic or major inspection**

This example report provides useful information on what to expect in a periodic or major inspection report from a competent person.

Note: Some items may have more than one observation, for example, slew bearings are typically checked at four positions and observation at all positions should be recorded.

| **Owner/Controller of the EWP****Location of inspection (street address)****Manufacturer:****Model No.:****Serial No.:** | **Contact person:** Joe Smith**Contact details.** Joe@email.com/0499 999 000**Start date****Date completed**Hour meter/odometer readingsDesign Registration No.: |
| --- | --- |
| **Details of additional service providers** |
| **Name** | **Company** | **Contact details** |
| Hydro Jones | EP hydraulics | 0444 444 999 |
| Mark Ghandi | Hello Electricals | 0494 949 494 |
| **Item** | **Description** | **Method of inspection****Example only** | **Acceptance criterion****For illustration only** | **Observation** | **Status** | **Comments Photos taken (Y/N)** |
| 1 | Slew bearing | Using a dial gauge  | 0.15 mm | 0.12 | Ok | N |
| 2 | Outrigger jack – left front | Using dial gauge with rated load | Creep less than 0.4 mm/10 min | 0.2 mm/min  | Ok | N |
| 3 | Horizontal Outrigger member | In-situ Visual | Paint cracking | No cracks | Ok | Y |
| 4 | Knuckle Pin  | Visual and measuring | Smooth surface and wear less than 0.1 mm in diameter | Rough surfaceWear 0.2 mm | NG | Not lubricated |
| 5 | Main lift cylinder | timer  | From fully retracted to fully extended in 24 to 27 sec | 35 sec | Not serviceable | Too slow |
| 6 | Item X |  |  |  |  |  |
| 7 | Item Y |  |  |  |  |  |
| 8 | Item Z |  |  |  |  |  |
| Comments (detailing the defect and how it was rectified):4. Replaced the pin and the bush with new components5. Tested the valve for the main lift cylinder before returning to service. Test result: 25 sec |
| Competent person | Phone number and email | Qualifications | Date of inspection |
| Signature | Date: |