VESI Guidance Note for Manoeuvering Loads with Elevating Work Platforms (EPV)

This Guidance Note has been developed by the Victorian Electricity Supply Industry (VESI) Work Practices Committee in consultation with Wenn Wilkinson and Associates

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DATE	VERSION	AMENDMENT
NOVEMBER 2015	1.0	FIRST RELEASE
AUGUST 2016	2.0	ADDITIONAL WORDING INCLUDED IN CLAUSE 5.3 TO PROVIDE GUIDANCE ON THE OBSERVERS POSITION FOR THE MONITORING OF SNAG HAZARDS
OCTOBER 2016	3.0	CLAUSE 5.3 REWRITTEN FOR CLARITY

CONTENTS

1 INTRODUCTION

Nationally, the principles and methods for installing crossarms and other bulky items such as lighting brackets on poles and structures throughout the electricity distribution networks are similar in every manner. Historically, these items were installed using ladders with block and tackle arrangements, however this work is now predominately performed using EWP's.

These work activities are undertaken on a regular basis across the VESI. This guideline outlines the principles associated with manoeuvring materials using EWP's in a safe manner to their installed location on the network.

2 PURPOSE

The purpose of this document is to provide safety guidelines for the manoeuvring of materials with EWP's.

3 SCOPE

This guideline applies to approved VESI personnel when working on VESI networks.

As this guideline is a founding principle, consultation should always occur with the Network owner to determine if there are any other requirements with this practice

4 OVERVIEW OF ASSESSMENT

This guideline note has been produced by the VESI Work Practice Committee (WPC) following recent discussions with Worksafe regarding the suitability of an EWP to lift and support crossarms and other materials on the basket rim

This practice raises a number of potential issues including the effects of overhanging loads, stability of the EWP and security of the load

The VESI WPC engaged Mr. Peter Wenn of Wenn Wilkinson and Associates (Mechanical Engineering Consultancy) to assess the impact of loads carried on the basket of a number of types of EWP's used in the VESI

The assessment included:

- Load bearing capacity of the basket wall from vertical and sideway forces
- Effect on stability of the EWP
- Snagging of the crossarm and the effect on the EWP
- Restraining the crossarm to the Basket
- Loading and load distribution of the basket
- Other loads

4.1 LOAD CARRYING CAPACITY OF BASKET WALLS

Vertical Forces

A nominal load of 100kg was applied on the top surface of one rim of the EWP basket. Results indicate that the compressive stress in the wall is negligible.

Sideway Forces

The capacity of the wall when subject to sideways forces is determined by the bending strength of the rim. Calculations indicate that the smallest rim is capable of sustaining a sideways load equal to the mass of a 100kg crossarm.

Outcome

The models assessed in all instances confirm the basket has adequate structural capacity to support the weight of a crossarm during normal use.

This is also confirmed by the following observations:

- The basket wall regularly supports the mass of a person egressing from the basket and observation of many EWP's over many years indicates no detrimental effect.
- During load testing of EWP's the test load is usually slung from a bar or soft sling that is placed over the basket rim. For most EWP's the test load is at least 1.5 times the rated capacity – equivalent to a load of at least 225kg acting on one side of the basket. (For a EWP with rated capacity of 300kg) and as such the basket is capable of supporting test loads of such magnitude without detriment.

4.2 STABILITY OF THE EWP

The effect on stability of the EWP arises from the increased wind area due to the crossarm and the increased height of the load.

Outcome

The effect on stability due the increased height of the load is negligible.

4.3 RATED CAPACITY

EWP's with a rated capacity of 250kg or less are not considered appropriate to carry crossarms as the rated capacity can be exceeded; e.g:

- Two people (nominally 160kg)
- The liner (55kg)
- Tools (approx...40kg) – a total of 245kg

One person could carry a smaller, lighter crossarm contained inside the basket (not on the basket rim) so long as it can be safely handled

4.4 LOADING AND LOAD DISTRIBUTION

Under no circumstances should the combined mass of persons, tools, equipment including the liner and cross arm exceed the rated capacity of the machine.

It is recommended that the mass of the tools contained in aprons be limited to those that are essential and frequently employed and most importantly, the tool aprons should be located at the front of the basket, (closest to the boom).

Concentration of load at the rear edge of the basket (that edge furthest from the boom) increases the forces in the basket levelling system and may result in failure of the levelling system in the medium term

4.5 SNAGGING THE CROSSARM

Most insulated EWP's are not fitted with a load limiting system and will have the capability, in certain positions, of obstructions applying forces against a basket (or boom), that is well in excess of the rated capacity of the EWP components.

This effect is amplified if the load is overhanging a basket, as could occur if a crossarm becomes entangled with conductors or other obstructions.

If the crossarm is secured to the basket and is snagged against an obstruction, the forces acting in components such as basket levelling systems, basket frames and rotators could foreseeably double or treble in magnitude.

If the crossarm is not restrained vertically, (so it can lift and tilt), the magnitude of the forces in such components is limited by the mass of the crossarm itself.

If the crossarm is secured to the basket rim e.g. by tying it down, there is a possibility of overload and instability should the crossarm become caught or snagged in conductors or caught under a structure.

Outcome

If there is any possibility of a crossarm being caught or snagged on external structures or conductors, the crossarm should not be completely secured and should, ultimately be permitted to fall from the basket.

4.6 OTHER LOADS

Other loads, such as lighting brackets or lengthy material could be supported on the basket rim in a similar manner to crossarms.

As a general rule for loads being carried on top of an EWP basket, the length of any load should not exceed 4.5m.

5 MANOEUVRING LOADS WORK PRACTICE

5.1 JOB SAFETY ANALYSIS (JSA)

It is a VESI requirement that prior to performing any work that all employees complete a JSA with reference to an appropriate Safe Work Method Statement (SWMS).

When preparing to use a EWP for any task you must consider:

- That sufficient authorised personnel have been allocated for the task
- The EWP and fall prevention equipment is appropriate for the task
- The condition of your tools and equipment
- The condition of the pole or structure and attachments such as, crossarms, hardware and conductors
- The classification of the pole and last inspection date – Serviceable, Limited life, Unserviceable
- What loading/change of loading will occur during the work
- A "push test" or “pull test” and Safe to Climb test if needed
- If support of the pole is required
- Drop zone management
- The combined weight of the person/s, equipment and material to be used and the SWL of the EWP

In all instances when working aloft a drop zone shall be assessed and established where practicable. Positioning of Safety Observers and/or ground assistants should also be determined to ensure they remain clear or are aware of the established drop zone area should they need to enter it to perform their duty.

Safe Approach Distances (SAD’s) to live apparatus shall be maintained at all times and appropriate control measures implemented as required. Where the SAD cannot be achieved or maintained works shall be completed by either utilising live work practices or Electrical Access Permit (EAP) conditions.

5.2 SAFE WORKING LOAD (SWL) CALCULATIONS

The Victorian Occupational Health and Safety Regulations 2007 require that all plant utilised for lifting is done so within the SWL. Prior to commencing the installation, the operator of the EWP shall make an assessment of the combined weight of person/s and equipment to ensure the SWL of the EWP basket is not exceeded.

When conducting the JSA, consideration shall be applied to the person/s and equipment requiring to be manoeuvred within the EWP basket subtracting this total from the EWP SWL. This total will be that which can be used to transport either material of additional equipment.

Figure 1 = Weight calculation

Dependant on the make, model and SWL rating of the EWP different conditions and restrictions apply for load carrying, these can be summarised as follows;

EWP's with a SWL ≤ 250kg	• In all instances the load shall not exceed the SWL of the EWP • No loads shall be carried on the basket rim • All load items shall be carried within the basket
EWP's with a SWL >250kg	• In all instances the load shall not exceed the SWL of the EWP • No load **> 60kg** can be carried upon the basket rim • Where a load is carried upon the basket rim refer to section 2.3 for the controls
Redmond Gary's with basket rotation	• In all instances the load shall not exceed a 250kg SWL of the EWP • No loads shall be carried on the basket rim • All load items shall be carried within the basket • Small, lighter crossarms can be carried within the basket with one person

5.3 EWP BASKET LOADS

When preparing to manoeuvre bulky loads into the installation position consideration shall be given to doing it safely.

Loads such as crossarms/loads should not be completely secured and should, ultimately be permitted to fall from the basket should it become snagged.

EWP's with a SWL greater than 250kg can be used to carry crossarms/loads on the basket rim up to 60kg so long as the basket SWL is not exceeded. The risk of the crossarm/load falling is to be controlled by employing the following method;

- Always employing two persons dedicated to the task of carrying crossarms on a basket rim - one as a dedicated Observer – (see tethering requirements 5.4).
  - The Observer must be located in a position that enables clear visibility and effective communication to immediately warn of any snag hazards.

    Normally this Observer is the second person in the EWP basket, however this may not always be the best option. If the observer is not in the basket with the EWP Operator, then they should be posted in the best available elevated location. Consideration should be given to using another EWP or a ladder.

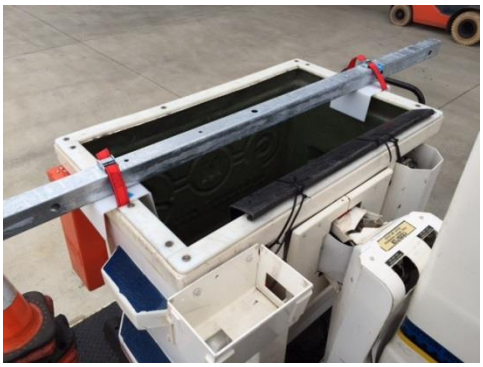
    Note that this Observer role is additional to the general Safety Observer positioned on the ground.

- Maintaining clearances from external structures and wires if the crossarm is secured to the basket
- Ensuring that the crossarm is released - in particular by permitting vertical movement
- Maintaining a drop zone at all times during the operation.

5.4 TETHERING REQUIREMENTS

In additional to the method above, crossarm tethering brackets shall be used to restrict horizontal movement. The advantage of this option is that it permits some flexibility in location of the crossarm, restricts (rather than prevents) movement in the horizontal direction and restricts vertical movement up to a limit which is determined by the length of the “leg” on the angle. It helps prevent excessive torques or moments being applied to the EWP in the event of snagging.

Any bracket intended to be used shall be subject to a risk assessment with consideration to the requirements within this guide.



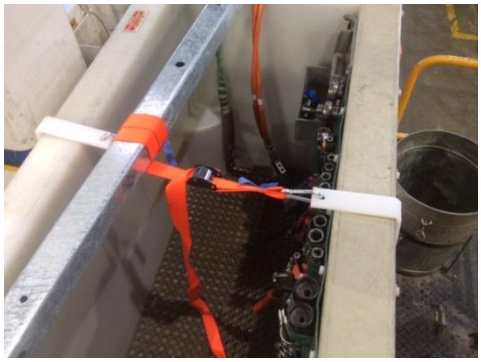


Figure 2 - Examples of brackets in use

5.5 MANOEUVRING THE EWP BASKET LOAD

Prior to operating the EWP to manoeuvre the crossarm into the installation position, a drop zone shall be established for the path to which the EWP basket will travel and the installation position.

A rule of thumb when working at heights less than 20m in the drop zone radius should be approximately one third (33)% of the working height. However, as a general rule, a minimum drop zone radius of 4m should be established (where practicable). For a working height of 20m or more the drop zone radius should be approximately one quarter (25%) of the working height where practicable - examples of this is as per Table 1 figures.

Table 1

Working Height (m)	Drop Zone Radius (m)		Working Height (m)	Drop Zone Radius (m)
12 or less	4		25	6
14	5		30	7.5
16	5.5		40	10
18	6		50	12.5
20	6		75	19

Where practicable the drop zone shall be monitored by the Safety Observer and the area barricaded off appropriately using devices such as witches hats, signage, chains etc.

5.6 SNAG/CATCH HAZARDS

Consideration shall be given to the path that will be selected to manoeuvre the EWP basket and its load. Where there is a potential of infringing SAD, appropriate live work practices along with controls such as matting or barriers shall be implemented or the works be undertaken using an EAP.

The EWP Operator shall ensure that the nominated Safety Observer is available to undertake the duty of observing and warning against unsafe approach to electrical apparatus or any asset that may present a hazard whilst the EWP and its load manoeuvres into work positions.

Figure 3