

# PHILIPPINE NATIONAL STANDARD

PNS/BAFS 394:2024  
ICS 65.060.01

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## Agricultural Mobile Elevating Work Platform — Specifications



### **BUREAU OF AGRICULTURE AND FISHERIES STANDARDS**

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## Foreword

In 2023, the Department of Agriculture (DA)-Philippine Center for Postharvest Development and Mechanization (PHilMech) proposed the development of Philippine National Standards (PNS) on Agricultural Mobile Elevating Work Platform — Specifications and Methods of Test. The proposal was submitted to and reviewed by the Philippine Council for Agricultural and Fisheries (PCAF)-National Sectoral Committee on Agricultural and Fisheries Mechanization (CAFMech).

In the same year, the Committee issued Resolution No. 18, series of 2023 (Recommending to the Bureau of Agriculture and Fisheries Standards [BAFS] to Include in their Priority List of the Philippine National Standards [PNS]/Philippine Agricultural and Biosystems Engineering Standards [PABES] for Development of the Standards for Mobile Elevating Work Platforms for Agricultural Purposes) for the development of this Standard to the DA-BAFS. The development aims to facilitate the use of Mobile Elevating Work Platform (MEWP) in agriculture, potentially addressing labor shortages during peak harvest periods and enabling safer manual operations on farms with fruit-bearing trees. Additionally, it intends to ensure and improve the quality of the machine by setting various performance parameters to be included as a requirement for the manufacturing of the MEWP.

In response, the DA-BAFS officially created a Technical Working Group (TWG) to develop the PNS under the following Special Orders (SO):

1. SO No. 305, series of 2024 (Creation of TWG and Project Management Team [PMT] for the Development of PNS for Agricultural and Fishery Products and Machinery);
2. SO No. 905, series of 2024 (Addendum to SO No. 305, series of 2024 entitled, “Creation of TWG and Project Management Team [PMT] for the Development of PNS for Agricultural and Fishery Products and Machinery”); and
3. SO No. 29, series of 2024 (Authority to Conduct and Attend the DA-BAFS Standards Development Division [SDD] Activities for the 2<sup>nd</sup> Semester CY 2024).

The TWG was composed of relevant stakeholders from the government sector, academe/research institutions, private sector organizations, and Civil Society Organizations (CSO). The draft PNS underwent an extensive series of TWG meetings and stakeholder consultations, facilitated through physical and online platforms, from January to September 2024 prior to its endorsement to the DA Secretary for approval.

This document was written in accordance with the formatting and editorial rules of the Standardization Guide No. 1 (Writing the PNS) developed by the Standards Development Division (SDD) of the DA-BAFS.

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## **1 Scope**

This Standard specifies the manufacturing, performance, and other requirements for mobile elevating work platform used specifically for agricultural and fishery purposes such as, but not limited to, orchard operations and servicing agricultural and biosystems infrastructures. This is not applicable to:

- a) Permanently installed personnel-lifting appliances serving defined levels;
- b) Fire-fighting and fire rescue appliances;
- c) Unguided work cages suspended from lifting appliances;
- d) Elevating operator position on rail-dependent storage and retrieval equipment;
- e) Tail lifts;
- f) Mast-climbing work platform;
- g) Fairground equipment;
- h) Lifting tables with a lifting height of less than 2m;
- i) Builder's hoists for persons and materials;
- j) Aircraft ground-support equipment;
- k) Digger derricks;
- l) Elevating operator positions on industrial trucks;
- m) Under-bridge inspection and maintenances devices; and
- n) Certain requirements for insulating aerial devices on a chassis for use in live work on electrical installations.

## **2 Normative References**

The following documents are referred to in the text in such a way that some or all their contents constitute the requirement of this document. The latest edition of the referenced documents (including any amendments) applies.

BAFS-DA. (2024). After-sales service — Guidelines (PNS/BAFS 192:2024).

BAFS-DA. (2024). Agricultural mobile elevating work platform — Methods of test (PNS/BAFS 395:2024).

BAFS-DA. (2024). Methods of sampling for agricultural and biosystems power and machinery — Guidelines (PNS/BAFS 391:2024).

BAFS-DA. (2024). Operator's manual for agricultural and biosystems power and machinery — Guidelines (PNS/BAFS 390:2024).

Occupational Safety and Health Center (OSHC)-Department of Labor and Employment (DOLE). (2020). Occupational safety and health standards. <https://oshc.dole.gov.ph/wp-content/uploads/2020/02/OSH-Standards-2020-Edition.pdf>

### 3 Terms and Definitions

For the purpose of this Standard, the following definitions shall apply:

#### 3.1

##### **aerial device**

any device, extensible, articulating or both, which is primarily designed and used to position personnel (International Organization for Standardization [ISO], 2010)

#### 3.2

##### **allowable inclination angle**

angle recommended by the manufacturer, measured between the ground and the chassis, when exceeded, may result in instability or overturning of the MEWP (Larin, 2018, *modified*)

*admitted term: gradeability*

#### 3.3

##### **load-sensing system**

system of monitoring the vertical load and forces on the work platform. This includes the measuring device, the method of mounting the measuring devices and the signal processing system (ISO, 2010)

#### 3.4

##### **MEWP**

machine/device intended for moving persons, tools and material to working positions, consisting of at least a work platform with controls, an extending structure and a chassis (ISO, 2010)

*admitted term: agricultural mobile elevating work platform*

##### 3.4.1

##### **chassis**

component of MEWP that provides support for mobility of the elevating assembly; base of a MEWP (ISO, 2010)

**NOTE** The chassis can be pulled, pushed, self-propelled, etc.

##### 3.4.2

##### **extending structure**

structure connected to the chassis that supports the work platform and allows work platform's movement to the required position (ISO, 2010)

##### 3.4.3

##### **work platform**

movable component of the MEWP, other than the chassis, intended for carrying personnel with or without material (ISO, 2010)

**3.5****orchard**

defined area where fruit trees are grown (ISO, 2011, *modified*)

**3.6****peak height**

vertical distance between the ground and the work platform when fully extended or raised to its highest position, expressed in meters, m (PHilMech-DA, 2023)

*admitted term: maximum height*

**3.7****rated load**

load for which the MEWP has been designed in normal operation, comprising persons, tools and materials, acting vertically on the work platform, expressed in kilograms, kg (ISO, 2010)

**3.8****stabilizer**

device or system used to stabilize a MEWP by supporting and/or levelling the complete MEWP or extending structure. This includes but is not limited to outrigger, jack, suspension-locking device, extending axle, or torsion bar (ISO, 2010)

**3.9****stowed position**

configuration of the MEWP in which the extending structure is lowered and retracted and stabilizers are retracted (ISO, 2010, *modified*)

**3.10****transport position**

configuration of the MEWP in which it can be transported (ISO, 2010, *modified*)

**3.11****vehicle**

any carrier that is not manually propelled (North Carolina State University, 2022)

**3.12****working inclination angle**

angle recommended by the manufacturer, measured between the ground and the chassis, at which the machine can be operated and elevated to full height (Duralift, 2020, *modified*)

*admitted term: operating angle*

**NOTE** This is typically 5 degrees or less for most common machines or around 10 degrees for machines with outriggers or stabilizers.

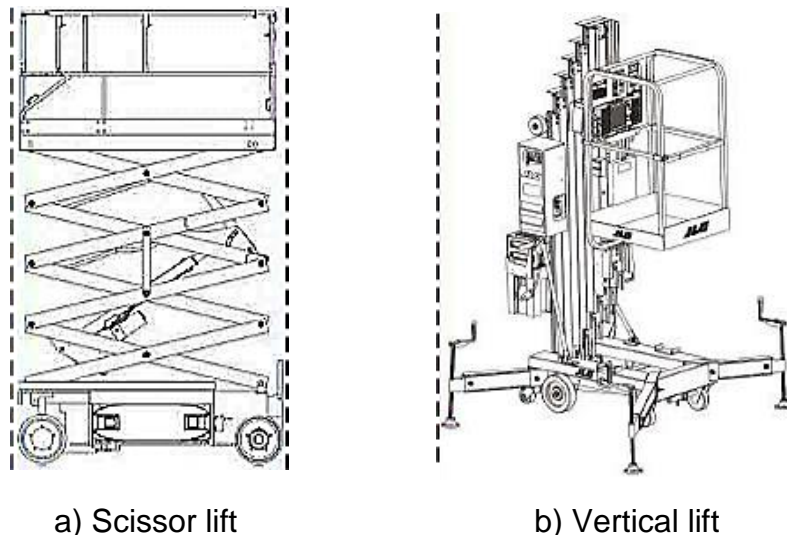
## 4 Classifications

The classifications of an MEWP shall be based on, but not limited to the following:

### 4.1 Type of grouping

#### 4.1.1 Group A

MEWP on which the vertical projection of the center of the platform area, in all platform configurations at the peak height specified by manufacturer, is always inside the tipping lines as shown in Figure 1.



a) Scissor lift

b) Vertical lift

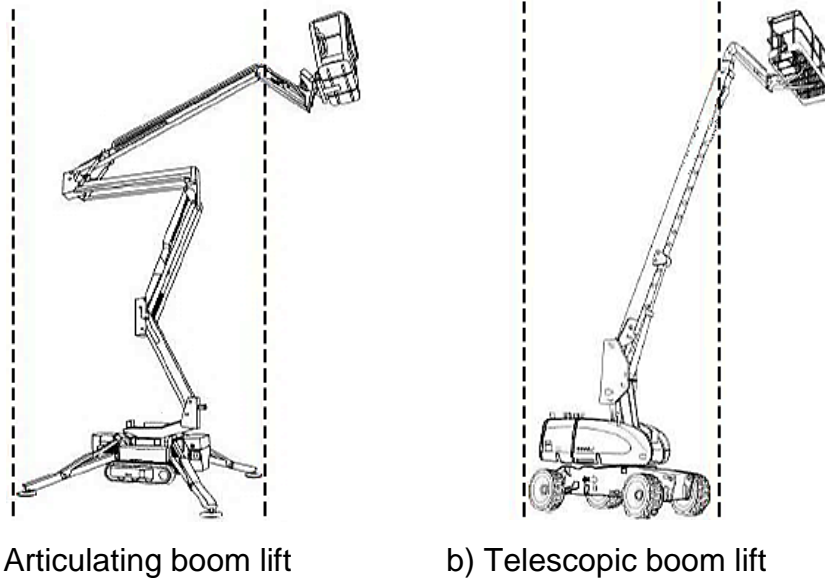
**Figure 1.** Typical designs of a a) Scissor lift and b) Vertical lift for Group A MEWP (adapted from JLG University Operator Training Program, 2018)

**NOTE** This type of MEWP is typically used for servicing agricultural and biosystems buildings and infrastructures.

#### 4.1.2 Group B

All other MEWP that does not belong to Group A, typically boom-type MEWP where the work platform extends past the machine's chassis or tipping lines as shown in Figure 2.





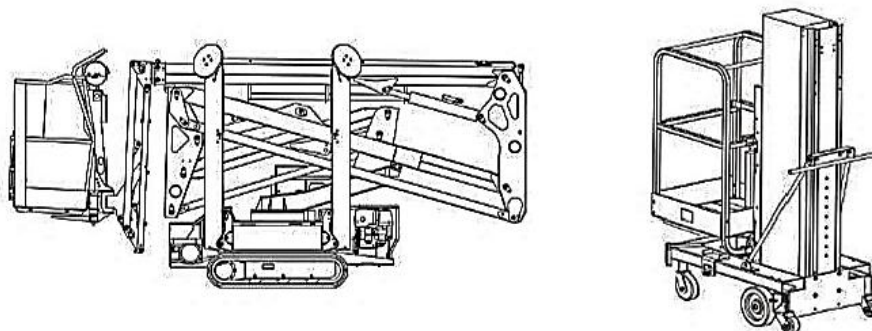
**Figure 2.** Typical designs of an a) Articulating boom lift and b) Telescopic boom lift for Group B MEWP (adapted from JLG University Operator Training Program, 2018)

**NOTE** This type of MEWP is typically used for orchard operations.

## 4.2 Type based on transport position and controller location

### 4.2.1 Type 1

MEWP for which travelling is only allowed when in the stowed position as shown in Figure 3.



**Figure 3.** Typical designs for Type 1 MEWP (adapted from JLG University Operator Training Program, 2018)

4.2.2 Type 2

MEWP for which travelling with the work platform in the elevated transport position is allowed and is controlled from a point on the chassis as shown in Figure 4.

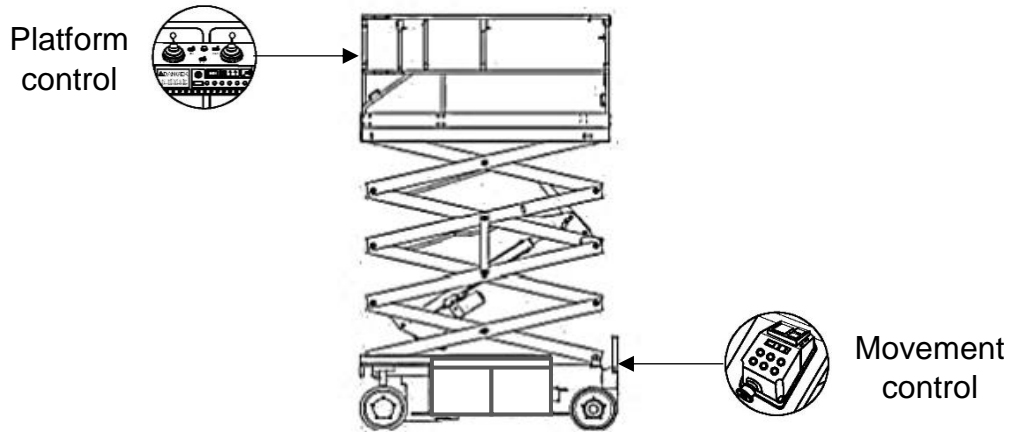


Figure 4. Typical design for Type 2 MEWP (adapted from JLG University Operator Training Program, 2018)

4.2.3 Type 3

MEWP for which travelling with the work platform in the elevated transport position is allowed and is controlled from a point on the work platform as shown in Figure 5.

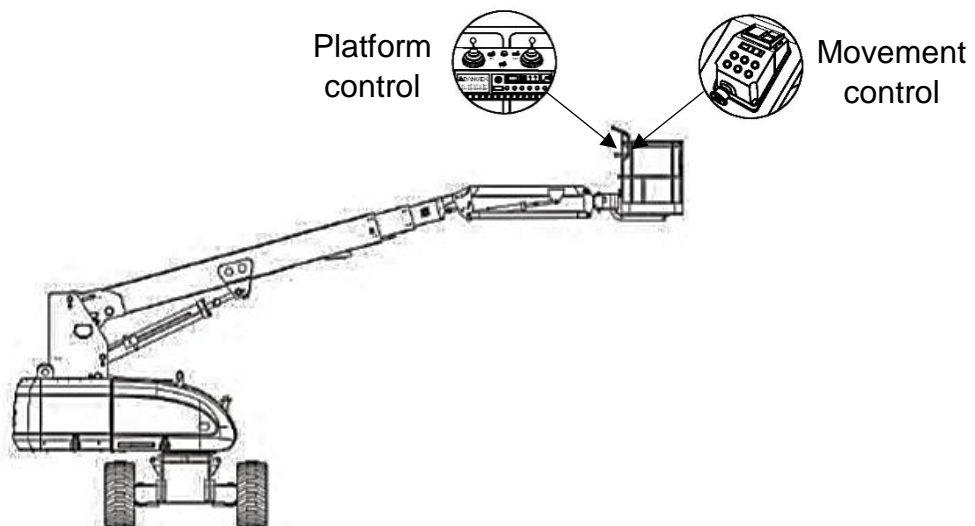


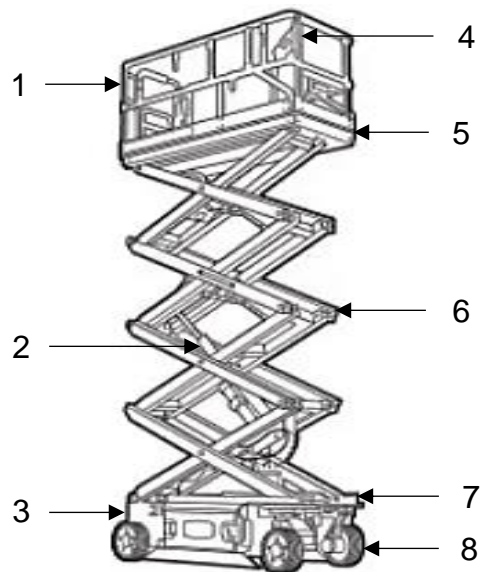
Figure 5. Typical design for Type 3 MEWP (adapted from JLG University Operator Training Program, 2018)

**NOTE** Type 2 and Type 3 can be combined and have a travelling control on both the chassis and work platform.

### 4.3 Type based on movement

#### 4.3.1 Pedestrian-controlled

MEWP whose controls for powered travel can be operated by a person from the ground by walking alongside, or in close proximity to the machine as shown in Figure 6.



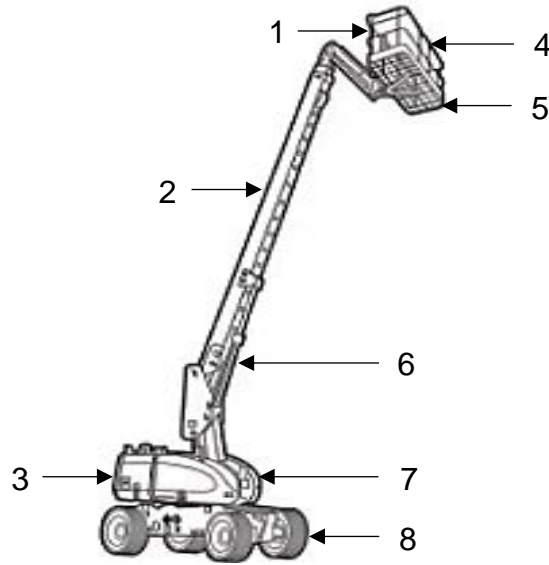
**Key:**

1	Guardrails	5	Work platform
2	Lift cylinder	6	Extending structure
3	Chassis	7	Ground controls
4	Platform controls	8	Wheels

**Figure 6.** Typical design for pedestrian-controlled MEWP (adapted from Watkins, 2022)

#### 4.3.2 Self-propelled

MEWP whose travelling controls are located on the work platform as shown Figure 7.



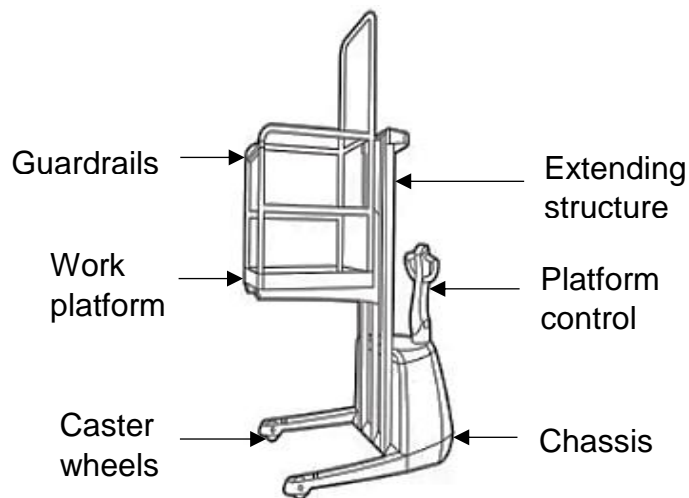
**Key:**

- |   |                                  |   |               |
|---|----------------------------------|---|---------------|
| 1 | Platform and travelling controls | 5 | Work platform |
| 2 | Extending structure              | 6 | Lift cylinder |
| 3 | Ground controls                  | 7 | Chassis       |
| 4 | Guardrails                       | 8 | Wheels        |

**Figure 7.** Typical design for self-propelled MEWP (adapted from Watkins, 2022)

**4.3.3 Totally manually controlled**

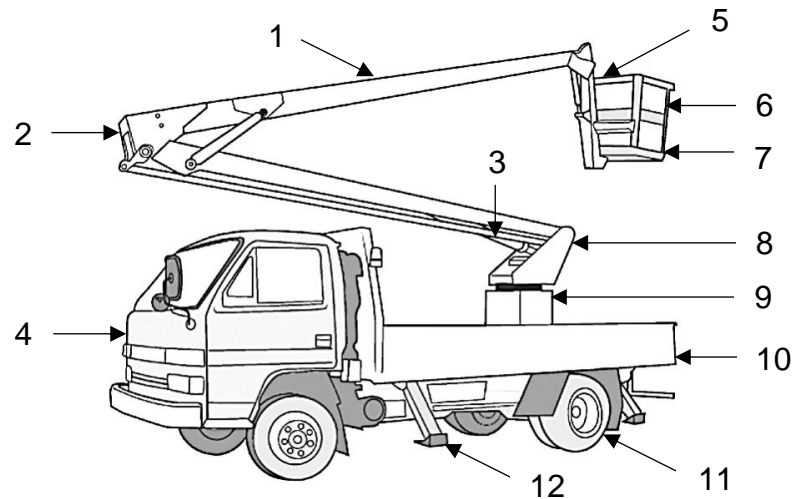
MEWP whose movement is powered only by manual effort as shown in Figure 8.



**Figure 8.** Typical design for totally manually-controlled MEWP (adapted from Watkins, 2022)

#### 4.3.4 Vehicle-mounted

MEWP whose aerial device is designed for and installed on a vehicle chassis as shown in Figure 9.



#### Key:

1	Extending structure	7	Work platform
2	Elbow	8	Turntable
3	Lift cylinder	9	Pedestal
4	Vehicle	10	Chassis
5	Platform controls	11	Wheels
6	Guardrails	12	Stabilizers

**Figure 9.** Typical design for vehicle-mounted MEWP (adapted from WorkSafe New Zealand, 2014)

#### 4.4 Type of lift operation

##### 4.4.1 Hydraulic lift

Type of MEWP that operates using fluid pressure in a cylinder to raise or lower the work platform.

##### 4.4.2 Pneumatic lift

Type of MEWP that operates using air pressure in a cylinder to raise or lower the work platform.

##### 4.4.3 Mechanical lift

Type of MEWP that operates using mechanical components such as chains, screws, or gears to raise or lower the work platform.

**4.5 Prime mover****4.5.1 Engine**

Type of MEWP that is driven by an internal combustion engine, such as gasoline or diesel engines.

**4.5.2 Motor**

Type of MEWP that is driven by electric motors such as direct current motors.

**5 Manufacturing Requirements**

**5.1** The work platform shall be provided with a safety harness attachment point.

**5.2** Directional controls such as joystick, lever or button controllers shall:

- a) Be of the type that will automatically return to the off or neutral position when released.
- b) Be protected against inadvertent operation.
- c) Be clearly marked as to their intended function.
- d) Have an overriding platform control that must be continuously activated for platform directional controls to be operational and which automatically returns to the off position when released.

**5.3** The MEWP shall be equipped with platform load-sensing or other similar mechanism which prevents operation at overloaded capacity.

**5.4** The rotating shafts, gears, and other moving parts exposed to contact shall be built with guard or cover.

**5.5** The main control should be preferably built at the work platform of the MEWP. In addition, the MEWP shall be equipped with emergency controls such as emergency button at ground level. Emergency ground level controls shall be clearly marked as to their intended function and be capable of overriding the platform controls.

**5.6** MEWP shall have an alarm and be designed with tilt sensor preventing certain movements when the peak height is reached. The adjustment of the device shall be secured and capable of being locked.

**5.7** Work platform railings shall have a minimum height of 1m and should require folding rails for movement through standard doorways.

**5.8** Safety features or mechanisms that prevent the operation of MEWP in low battery conditions shall be provided.

- 5.9** For MEWP used in nighttime operations, it shall be equipped with headlights and auxiliary lighting system suitable for the operation and work performed. The light intensity requirements should be in accordance with the Rule 1075 of Occupational safety and health standards of the Occupational Safety and Health Center (OSHC)-Department of Labor and Employment (DOLE).
- 5.10** Crate holder should be adjustable to accommodate different crate sizes and enhance versatility of the MEWP.
- 5.11** The MEWP should have a work platform dimension to safely accommodate a minimum of 2 operators.
- 5.12** The minimum rated load of the MEWP shall be 170 kg if used for orchard operation and 120 kg if used for servicing agricultural and biosystems buildings and infrastructures.
- 5.13** The work platform of the MEWP should be equipped with an operational removable tool holder.
- 5.14** The MEWP shall be equipped with a stabilizer to improve stability and prevent slippage specifically in uneven or hilly areas.
- 5.15** For MEWP used in orchard operations, their peak height should not be less than the height of the trees they are intended for. Annex A (Average heights of fruit-bearing plants in the Philippines) provides the average heights of fruit-bearing plants typically cultivated in the Philippines.
- 5.16** For MEWP used in servicing agricultural and biosystems buildings and infrastructures, the peak height should not be less than 2.4 meters, in accordance to the minimum room height specified in the Presidential Decree No. 1096 (National Building Code of the Philippines).
- 5.17** The work platform shall have a guardrail with a minimum height of 0.7 m.
- 5.18** For non-insulating work platforms, flooring shall have drain holes and/or access openings to facilitate water drainage and prevent hazards.
- 5.19** The work platform should be made of at least non-flammable materials.
- 5.20** The external metallic surfaces of the MEWP shall be coated (e.g., painted, galvanized).
- 5.21** For hydraulic operated MEWP, ISO 4413:2010 or other applicable references may be used for the basis of general rules and safety requirements (e.g., design, construction, and modification of systems) for the hydraulic fluid power systems and components of the MEWP.

**5.22** For hydraulic operated MEWP, the pipings, hoses, and fittings shall be able to withstand the maximum operating pressure.

**5.23** For hydraulic operated MEWP, it should be equipped with reservoir with complete accessories, oil cooler, pressure relief valve and gauges.

## **6 Performance Requirements**

**6.1** The MEWP shall not have a mechanical failure such as excessive bending, twisting, buckling, and bursting.

**6.2** The MEWP shall not have a failure on the pneumatic and hydraulic components such as excessive heating, fitting leakage, and internal leakage.

**6.3** The following performance parameters of MEWP specified by the manufacturer shall be attained:

- a) Battery performance;
- b) Maximum traveling speed;
- c) Maximum allowable inclination angle without overturning; and
- d) Rated load at normal to maximum allowable inclination angle.

**6.4** The MEWP shall possess sufficient stability to avert the risk of structural failure and overturning.

## **7 Safety, Workmanship, and Finish**

**7.1** Appropriate fall protection devices (e.g., full body harness, restraint lanyard, designated anchor point) shall be provided to be used during operation.

**7.2** The use of MEWP in terms of operator's exposure on permissible noise level shall conform to Rule 1074.01 to 1074.03 of Occupational safety and health standards of OSCH-DOLE as shown in Annex B (Occupational safety and health standard [Rule 1074.01– 1074.03]).

**7.3** If the machine exceeds the noise level of 90 db(A), an ear protective device shall be provided.

**7.4** The MEWP shall be free from defects that may be detrimental to its use and shall be free from sharp edges and surfaces that may hurt the operator.

**7.5** Any locking pins shall be secured against unintentional disengagement (e.g., spring pin) and loss (e.g., chain).

**7.6** For pedestrian-controlled MEWP, the control and tow bars shall be securely fastened to the chassis.



- 7.7** If the control and tow bars, when not in use, are raised to the vertical position, an automatic device (e.g., hook) shall be provided to hold the bars in this position; sudden fall shall be prevented. For multi-axle chassis, the minimum clearance between the fully lowered control bar and tow bar and the ground shall be 120 mm.
- 7.8** There shall be a safety mechanism that prevents the work platform from operating unpermitted positions, unless the stabilizers are set in accordance with the operating instructions.
- 7.9** Manually operated stabilizers shall be designed to prevent unintentional movement.
- 7.10** A mechanical device shall be provided to prevent uncontrolled movements of stabilizers from the transport position.
- 7.11** Stabilizers shall be locked in the transport position by two separate locking devices for each stabilizer, at least one which operates automatically (e.g., gravity locking pin and detent).
- 7.12** For vehicle-mounted MEWP, it shall be equipped with one or more indicators visible from the travelling controls to indicate if all parts of the stabilizers, the extending structure, the access ladders and the work platform of the MEWP are in the transport position.
- 7.13** Any control shall provide the operator with proper markings and directional guides with the resulting movements.
- 7.14** The MEWP shall be equipped with a device to prevent unauthorized use (e.g., lockable switch).
- 7.15** The guard shall be provided to protect persons at control positions or standing adjacent to the MEWP at ground level or at other points of access, against thermal or mechanical hazards. The opening or removal of these guards shall only be possible by means of devices stored in fully enclosed and lockable enclosures (e.g., cabs, compartments) or by the use of tools or keys provided with the MEWP.
- 7.16** For engine-driven MEWP, the exhaust from internal combustion engines shall be directed away from control positions.
- 7.17** Filling points or gas and fluid reservoirs (other than for fire-resistant fluids) shall be properly positioned so as to avoid any fire from spillage onto very hot parts (e.g., engine exhausts).
- 7.18** The batteries and battery containers shall be securely fastened. In the event of overturning, a means shall be provided to constrain the battery assembly to prevent the risk of injury to the operator or electrolyte being ejected.

- 7.19** Suitable ventilation holes shall be provided in the battery container, compartment or cover so that dangerous accumulations of gases do not occur in places occupied by operators.
- 7.20** The floor of the work platform, including any trapdoor, shall be slip-resistant and self-draining. Any opening in the floor or between the floor and toe guards or access gates shall not be greater than 15 mm.
- 7.21** The material to be used as guardrails or access gates should be durable enough and shall be made of any corrosion resistant material.
- 7.22** When the distance between the access level and the upper edge of the toeguard in access position exceeds 0.7 m, the MEWP shall be provided or equipped with an access ladder symmetrical with the access gate.
- 7.23** Handhold, handrails or similar adequate devices shall be provided for both hands while climbing or descending the access ladder to the work platform. They shall be arranged to avoid the use of controls and piping as handholds or footsteps.
- 7.24** Trapdoors in work platforms shall be securely fastened to the work platform so that no inadvertent opening is possible. It shall be designed to prevent opening downward or to slide sideward.
- 7.25** The work platform shall be supported in the transport position in such a way as to avoid harmful vibrations during transport.
- 7.26** Pilot and solenoid-operated control valves shall be so designed and installed that they automatically stop corresponding movement in the event of power failure. On starting, or on restoration of power after failure of the power supply, no movement shall occur without a deliberate action on the part of the operator.
- 7.27** A device should be provided to limit the speed of movement of the work platform to 1.4 times normal speed even under emergency operations.
- 7.28** If the MEWP is equipped with a material-handling winch, this shall have both upper controls and lower controls. The lower controls shall be located in close proximity to the lower control station.
- 7.29** For MEWP with non-conductive (insulating) components, the lower control shall be located such that an operator of the lower winch control is not placed in the electrical path between the aerial device and the ground.
- 7.30** A main switch shall be fitted in an easily accessible position. It shall be securely located and able to be disconnected by means of a locking device or equipment, to prevent operation.

- 7.31** Cable and electrical wiring shall be multi-stranded when flexibility is necessary and, if necessary, shall be oil-resistant. All connections shall be weatherproof.
- 7.32** Battery shall be equipped with fuse or disconnecting devices to be protected against damage due to short circuits and against mechanical damage. If batteries are the primary power source, it shall be capable of being disconnected without the use of tools.
- 7.33** Each hydraulic circuit shall be provided with sufficient connections for gauges to allow checking for correct operation.
- 7.34** The design of the hydraulic system shall enable entrapped air to be vented.
- 7.35** Any fluid reservoir open to the atmosphere shall be equipped with an air-inlet filter.
- 7.36** Each fluid reservoir tank shall be equipped with accessible devices indicating both the permissible maximum fluid level and the necessary minimum level and temperature gauge when the extending structure is fully lowered and retracted and the stabilizers fully retracted. The hydraulic tank inlet, suction pipe, and return pipe shall be provided with a filter and drain with plug.
- 7.37** The directions of all movements of the MEWP shall be clearly indicated on or near the controls by words or symbols in accordance with ISO 20381:2009 (Mobile elevating work platforms — Symbols for operator controls and other displays).
- 7.38** The work platform shall be equipped with a feature/auxiliary component that descends the operator safely to the ground (e.g., automatic fail shift mechanism, or emergency ladder) in cases when the battery reaches low level during operation.
- 7.39** For MEWP used in orchard operations, the MEWP should be equipped with lightning arrester.
- 7.40** Personal protective equipment should be provided as recommended by the manufacturer.

## **8 After-sales Service Requirements**

Requirements for after-sales services shall be in conformance with PNS/BAFS 192:2024 (After-sales service — Guidelines).

## **9 Maintenance and Operation**

- 9.1** Each unit of the MEWP shall be provided with a set of standard tools for operation and basic maintenance as prescribed by the manufacturer.
- 9.2** An operator's manual for the MEWP shall be provided in conformance with PNS/BAFS 390:2024 (Operator's manual for agricultural and biosystems power and machinery — Guidelines). The operator's manual shall include emphasis on the safety and health hazards especially the use of basic personal protective equipment.
- 9.3** Rails shall be locked in the upright position before elevating the platform.
- 9.4** The MEWP should not be positioned near to the edge of trenches and other excavations as these are likely to collapse without warning. If the equipment needs to be used close to the edge of a slope or excavation, with the outriggers or wheels in the "Danger Area", an engineering assessment shall be conducted by a competent geotechnical engineer before the MEWP is set up and operated.
- 9.5** The strength of the ground should be considered when operating a MEWP for safety purposes.
- 9.6** The weight (including workers, tools, or materials) should be evenly distributed across the work platform to avoid tipping, instability, or strain on one part of the machine during operation.
- 9.7** The wheels of the MEWP shall be securely locked to avoid unwanted movement during operation. Usage of outriggers with adequate sole plates shall be imposed.
- 9.8** Vehicle mounted MEWP shall be provided with means of communication (i.e., walkie-talkie) between the persons on the work platform and the driver.
- 9.9** The MEWP should be provided with an anemometer, preferably built-in.
- 9.10** The MEWP shall not be operated when the wind speed exceeds 12.5 m/s which is the Beaufort Scale 6.

## **10 Sampling**

The MEWP shall be sampled for testing in conformance with PNS/BAFS 391:2024 (Methods of sampling for agricultural and biosystems power and machinery — Guidelines) or other suitable method of selection validated by the testing authority.

**11 Testing**

The sampled MEWP shall be tested in accordance with PNS/BAFS 395:2024 (Agricultural mobile elevating work platform — Methods of test).

**12 Markings and Labeling**

**12.1** Each unit of MEWP shall be provided with the following information, either in the body or in a metal nameplate attached at the most conspicuous place:

- a) Brand;
- b) Model;
- c) Serial number;
- d) Country of manufacture/origin;
- e) Special features, cautions, restrictions necessary for operation; and
- f) Rated load, kg.

**12.2** Other markings and labeling shall comply with the applicable regulations set by the competent authority.

**12.3** Basic operation reminders shall be stated in the operator's manual.

**Annex A**  
(Informative)

**Average heights of fruit-bearing plants in the Philippines**

No.	Common name	Average height, m
1.	Mango <sup>a</sup>	12.4
2.	Durian <sup>b</sup>	19.7
3.	Jackfruit <sup>b &amp; c</sup>	9.55
4.	Santol <sup>b</sup>	10
5.	Marang <sup>b &amp; c</sup>	13.3
6.	Antipolo <sup>b &amp; c</sup>	13.1
7.	Breadfruit <sup>c</sup>	9.6
8.	Coconut <sup>d</sup>	21.3
9.	Coffee <sup>e</sup>	
	a) Robusta	4.5
	b) Excelsa	3
	c) Arabica	3
	d) Liberica	9

<sup>a</sup> Philippine Center for Postharvest Development and Mechanization (PHilMech)-Department of Agriculture (DA). (2023). Adaptability testing of self-propelled mechanical elevating work platform for harvesting and other farm production operations of mango [Draft].

<sup>b</sup> Alipon, M., Bondad, E., Sapin, G., & Marasigan, O. (2021). Physical and mechanical properties of selected fruit-bearing and underutilized tree species in the Philippines. *Philippine Journal Science*, 151 (1), 341-356.  
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<sup>c</sup> Bullecer, R. & Socorin, L. (2013). Growth performance of planted indigenous trees 12 years from establishment. *International Journal of Environmental and Rural Development*, 4 (1). [https://doi.org/10.32115/ijerd.4.1\\_118](https://doi.org/10.32115/ijerd.4.1_118)

<sup>d</sup> Philippine Coconut Authority (PCA)-Department of Agriculture (DA). (2022). Philippine coconut industry roadmap 2021-2040.  
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<sup>e</sup> Agricultural Training Institute (ATI)-Department of Agriculture (DA). (nd). Techno Guide (Coffee). <https://ati2.da.gov.ph/ati-4b/content/sites/default/files/2022-11/Coffee%20Technoguide%20w%20page%20numbers.pdf>

## Annex B (Informative)

### Occupational safety and health standards (Rule 1074.01–1074.03)

#### B.1 Threshold limit values for noise

- B.1.1** The threshold limit values refer to sound pressure that represents conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse effect on their ability to hear and understand normal speech.
- B.1.2** Feasible administrative or engineering controls shall be utilized when workers are exposed to sound levels exceeding those specified in Table B.1 hereof when measured on a scale of a standard sound level meter at slow response. If such controls fail to reduce sound within the specified levels, ear protective devices capable of bringing the sound level to permissible noise exposure shall be provided by the employer and used by the worker.

**Table B.1.** Permissible noise exposure (OSHC-DOLE, 2020)

Duration per day, h	Sound levels (slow response), dB(A)
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼	115

#### B.2 Permissible noise exposure

- B.2.1** The values specified in Table B.1 apply to total time of exposure per working day regardless of whether this is one continuous exposure or a number of short-term exposures but does not apply to impact or impulsive type of noise.
- B.2.2** If the variation in noise level involves maximum intervals of one second or less, it shall be considered as continuous. If the interval is over one second, it becomes impulse or impact noise.
- B.2.3** When the daily noise exposure is composed of two or more periods noise exposure of different levels, their combined effect should be considered rather than the effect of each.

- B.2.4** If the sum of the fraction in Equation 1 exceeds one, then the mixed exposure should be considered to exceed the threshold limit value. *C* indicates the total time exposure at a specified noise level, and *T* indicates the total time of exposure permitted at the level. However, the permissible levels indicated in Table B.1 shall not be exceeded for the corresponding number of hours per day allowed. Noise exposures of less than 90 dB(A) are not covered by Equation 1.

$$X = \frac{C_1}{T_1} + \frac{C_2}{T_2} + \frac{C_3}{T_3} + \dots + \frac{C_n}{T_n}$$

where:

<i>X</i>	is the sum of the ratios of <i>C</i> and <i>T</i>
<i>C</i>	is the total time of exposure at a specified noise level
<i>T</i>	is the total time of exposure permitted at the level

- B.2.5** Exposures to impulsive or impact noise shall not exceed 140 dB(A) peak sound pressures level (ceiling value).



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