

<b>PRINCETON PLASMA PHYSICS LABORATORY</b>	<b>ENGINEERING STANDARD</b>		<b>No. ES-MECH-009, Rev. 0 Page 1 of 3</b>
<b>Subject:</b>  <b>Design, Construction and Inspection of Wooden Stairs and Platforms</b>	<b>Effective Date:</b>  <b>January 29, 2010</b>	<b>Initiated:</b>  <b>Construction Manager</b>	
	<b>Supersedes:</b>  <b>New</b>	<b>Approved:</b>  <b>Associate Director, Engineering and Infrastructure</b>	

**Applicability:** This Engineering Standard applies to all new and existing stairs, platforms and structures to support people that use components made of wood or wood products. It applies to both outdoor and indoor installations.

**Introduction:** This Standard provides the criteria for designing, constructing and performing inspections of all stairs and platforms that use components made of wood or wood products, as well as the inspection and maintenance requirements for these wooden structures. Existing structures will need to be retrofitted/rebuilt to comply with this standard.

**Reference Documents:**

International Building Code (Section 1009 on Stairways, Section 1010 on Ramps, and Section 1012 on Handrails)

DCA-6, Design for Code Acceptance, *Prescriptive Residential Wood Deck Construction Guide* from the American Forest & Paper Association, Inc. (AFPA)

29CFR1926.1052, Stairways section of OSHA Construction Industry Regulations

**Design and Construction Requirements:**

The design and construction of interior and exterior wooden stairs and/or platforms must be done as follows:

1. Pre-engineered and fabricated stairs and platforms that meet OSHA or International Building Code requirements should be used whenever possible. The capacity must be at least 100 psf and be capable of withstanding at least 300 # on a 4 square inch area of the stair treads.
2. If stick-built stairs or platforms are used, the design must be approved in writing by the Facilities Division Head or the Construction Manager or the Technical Shops Branch Head or the Facilities Branch Head and be based on the guidance in the International Building Code and the "Prescriptive Residential Deck Construction Guide" issued by the AFPA. The capacity must be at least 100 psf and be capable of withstanding at least 300 # load on a 4 square inch area of the stair treads. When pressure treated wood is used, all fasteners must be 304/316 stainless steel or triple galvanized or approved for use with ACQ (alkaline copper quaternary) wood.
3. Stick-built stairs must be:
  - a. at least 36" wide
  - b. have at least three stringers
  - c. have treads with a capacity of at least 1,000#
  - d. have non-skid surface treatment on treads
  - e. constructed of composite material when available and appropriate
4. All platforms serving as landings to building/facility egress points shall be of sufficient size to allow for door swing and at least one person on the landing. Landings shall be no greater than 1½" below the threshold of the doorway.

5. All locations of work platforms and stairways that provide egress from office type facilities and trailers shall have local lighting.
6. All stairs and platforms greater than 30” above grade are required to have a guard and handrails that comply with DCA-6 or OSHA requirements. Handrails must be rated for 50 plf and be capable of withstanding a side load of 250# at any point.
7. All exterior wood structures that are considered permanent (greater than 90 days of service) must have foundations sized to support the load and extend at least 42” below grade surface. Stairs shall terminate on a sidewalk, concrete pad or asphalt pad. All wood structures shall be anchored to prevent wind lift or overturn when the International Building Code requires such anchoring.
8. Ramps that are to provide handicapped access shall meet ADA requirements for width, slope, railing treatment, length of sloped run, and landing size/location as specified in the ADA Standards for Accessible Design, 28 CFR Part 36.
9. The installation of all stairs and platforms, whether pre-fabricated or built on-site, must be inspected by one of the individuals listed in item #4 of the Inspection Requirements below. The person must approve the installation in writing before the stairs and/or platform can be used.
10. Portable stairs must comply with all OSHA requirements.

**Inspection Requirements:**

1. Inspections before use shall verify compliance with
  - a. The applicable sections of the International Building Code (including the DCA-6 guidance)
  - b. The stairways section of OSHA Construction Industry Regulations, 29CFR1926.1052, as applicable
2. Inspections before use shall also determine if the following are acceptable:
  - a. Structural integrity of the existing design
  - b. Condition of materials (fastener corrosion and wood splitting, checking and cupping)
  - c. Surface condition to prevent slippage (mold, water retention, etc.)
  - d. Meets ADA requirements where applicable
3. Annual inspections shall look for:
  - a. Damage to any component and its impact on the structural integrity
  - b. Loose joints or fasteners
  - c. Condition of materials (fastener corrosion and wood splitting, checking and cupping)
  - d. The need for re-sealing or re-painting to prevent deterioration (water must bead on surface)
4. Initial and annual inspections must be performed and documented by one of the following persons:
  - Facilities Division Head
  - Facilities Branch Head
  - Technical Shops Branch Head
  - Construction Manager
5. Records of inspections and preventative maintenance will be kept by the Facilities Division.

### Inspection of Wooden Stairs/Ramps/Platforms

Structure Number: \_\_\_\_\_

Location: \_\_\_\_\_

Description: \_\_\_\_\_

Inspection Type: Prior to Initial Use  Annual

#### Inspection Prior to Initial Use Requirements

Satisfactory

- |    |  |                          |
|----|--|--------------------------|
| 1. | Verify compliance with Engineering Standard ES-MECH-009  | <input type="checkbox"/> |
| 2. | Verify compliance with the following requirements:   |                          |
|    | • International Building Code (including the DCA-6 guidance)                                     |                          |
|    | Stairs   | <input type="checkbox"/> |
|    | Ramps  | <input type="checkbox"/> |
|    | Platforms / Landings   | <input type="checkbox"/> |
|    | Railings   | <input type="checkbox"/> |
|    | Handrails  | <input type="checkbox"/> |
|    | • The stairways section of OSHA Construction Industry Regulations, 29CFR1926.1052, as applicable |                          |
| 3. | Determine if the following items are acceptable:   |                          |
|    | • Structural integrity of the existing design  | <input type="checkbox"/> |
|    | • Condition of materials (wood splitting, checking and cupping)                                  | <input type="checkbox"/> |
|    | • Surface condition to prevent slippage (anti-slip tape or paint)                                | <input type="checkbox"/> |
|    | • Sealing or painting of wood used outside   | <input type="checkbox"/> |
|    | • Meets ADA requirements where applicable  | <input type="checkbox"/> |

#### Annual Inspection Requirements

- |    |  |                          |
|----|--|--------------------------|
| 1. | Inspections should check for the following:  |                          |
|    | • Damage to any component and its impact on the structural integrity                           | <input type="checkbox"/> |
|    | • Loose joints or fasteners  | <input type="checkbox"/> |
|    | • Condition of materials (fastener corrosion and wood splitting, checking and cupping)         | <input type="checkbox"/> |
|    | • The need for re-sealing or re-painting to prevent deterioration (water must bead on surface) | <input type="checkbox"/> |

Comments: \_\_\_\_\_

Inspection Performed by: \_\_\_\_\_ Date: \_\_\_\_\_

Records of inspections and preventative maintenance will be kept by the Facilities Division.