Designation: F3557 – 22

Standard Practice for Field Measurements of Snow Sport Freestyle Terrain Jumps[1]

This standard is issued under the fixed designation F3557; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice is intended to standardize field measurements of existing snow sport freestyle terrain park jumps. It does not cover other types of terrain park features or asymmetric jumps.

1.2 This practice is for measuring jumps that are used in public access snow sport freestyle terrain parks discussed in Terminology F3237.

1.3 For features with multiple takeoffs, each takeoff should be considered as an independent jump and measured according to this practice.

1.4 The depictions and terrain features used in this standard are intended to aid understanding the definitions and methods and are not intended to depict or describe how any particular terrain park jump or its component features should be designed, built or maintained. Some terrain park features may use components that are not depicted or described in this standard, or they may use different configurations or combinations of components, or they may not incorporate all of the components depicted or defined in this standard.

1.5 This standard does not purport to address all of the safety concerns, if any, associated with the use of snow sport terrain park features. Snow sports and the use of terrain park features involve inherent risks, and a terrain park feature that complies with all applicable standards or guidelines cannot eliminate all risks associated with terrain park features. Therefore, it is to be clearly understood that compliance with these applicable standards or guidelines in no way guarantees that injury can be prevented.

1.6 *Units*—The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.7 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.8 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

F3237 Terminology Relating to Snow Sport Freestyle Terrain Park Jumps

3. Terminology

3.1 Definitions of terms specific to this practice are contained in Terminology F3237.

4. Summary of Practice

4.1 The general process for measuring a jump is to identify the centerline (typical jumper path) that represents the geometry of the jump (see Fig. 1).

4.2 *Methods:*

4.2.1 *Method A*—National Ski Areas Association (NSAA) method,

4.2.2 *Method B*—Digital level,

4.2.3 *Method C*—Differential global positioning system (GPS), and

4.2.4 *Method E*—Laser scanner.

4.3 Choose one of the methods in 4.2.1 – 4.2.4 and the appendixes to measure:[3]

4.3.1 Approach angle (a-b),

4.3.2 Takeoff surface length from zero point to lip (c-d),

4.3.3 Takeoff height above zero point (c-d),

[1] This practice is under the jurisdiction of ASTM Committee F27 on Snow and Water Sports and is the direct responsibility of Subcommittee F27.70 on Freestyle Terrain Jump Features.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Certain types of jump features may not contain every component listed above and therefore a measurement value may not be obtained or the value obtained may be zero, or both.

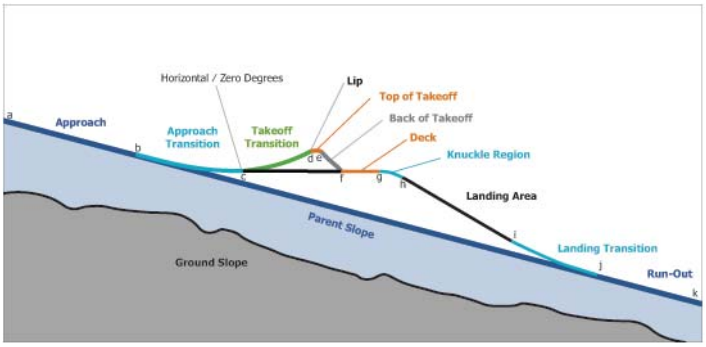

FIG. 1 Field Measurements of Existing Snow Sport Freestyle Terrain Park Jumps

4.3.4 Takeoff height above start of landing (d-h),
4.3.5 Takeoff transition radius from zero point to lip (c-d),
4.3.6 Lip angle (d),
4.3.7 Width of takeoff at lip,
4.3.8 Width of bypass lanes,
4.3.9 Depth of top of takeoff (d-e),
4.3.10 Length of back of takeoff (e-f),
4.3.11 Angle of back of takeoff (e-f),
4.3.12 Deck angle (f-g),
4.3.13 Horizontal distance from lip to start of landing (d-h),
4.3.14 Width at top of landing,
4.3.15 Landing surface angle at start of landing (h),
4.3.16 Landing length (h-i),
4.3.17 Width at toe of landing,
4.3.18 Parent slope angle (b-j), and
4.3.19 Overall feature length (b-j).

5. Significance and Use

5.1 This practice serves the purpose of measuring snow sports freestyle terrain jump features and may be used as a method for recreating jumps in the field or two-dimensional jump profiles of existing jumps.

6. Determining Center Line

6.1 If the jumper path is not apparent (visually obvious because of tracks in the snow), it may be necessary to identify the centerline of the jump. Following is the recommended method for finding the centerline:

6.1.1 The jump takeoff centerline may be identified by placing a flag on the two (outside) corners of the lip. Measure between the flags, identify, and clearly mark the center of lip (Point d in Fig. 1) halfway between the flags using another flag, ski pole, or other marking device.

6.1.2 At the low point of the takeoff transition where the edges of the takeoff are still apparent (as far as Point c in Fig. 1), place a flag on each edge of the takeoff transition. Measure between the flags, identify, and clearly mark the center of the takeoff transition using a flag, ski pole, or other marking device.

6.1.3 Proceed to the knuckle region; place a flag at each outside edge/corner of the knuckle region. Measure between the two flags, identify, and clearly mark the center of the knuckle (Point g in Fig. 1) using another flag, ski pole, or other marking device.

6.1.4 Attach the zero end of a tape measure to the knuckle region center point and align the three centerline flags with the tape. Continue up the approach in this direction as far as necessary to include the angle of the parent slope.

6.1.5 If the three points do not align, adjust the knuckle center point to be in line with the lip and takeoff transition flags. This may be the case with multiple takeoff or other jumps.

6.1.6 This centerline can be continued down to the toe of the landing (Point i in Fig. 1) or where the landing returns to parent slope (Point j in Fig. 1).

6.2 All of the various measurement methods will provide a representative set of measurements along the centerline.

7. Precision

7.1 Distance measurements are to be achieved within ½ of 1 ft (0.3 m).

7.2 Angle measurements are to be achieved to within 1° and will be listed in degree of slope.

8. Keywords

8.1 approach; deck; freestyle terrain; jump; knuckle; landing; lip; takeoff; terrain park

APPENDIXES

(Nonmandatory Information)

The measurement methods referenced in these appendixes are identified only as examples. This list is not intended to exclude the use of other measurement methods. All measurement methods require proper use of appropriate equipment by trained personnel capable of achieving reliable and accurate results that are suitable for the intended purpose.

X1. NSAA MEASURING METHOD

X1.1 NSAA has published a jump measurement procedure in the NSAA Freestyle Terrain Resource Guide materials. Full instructions for this method may be obtained by NSAA members at nsaa.org, but the following is a brief description using Fig. 1 as a reference:

X1.1.1 All measurements will be recorded in the accompanying spreadsheet that may be found along with instructions on the NSAA website. Each specific measurement is inserted in a specific box on the spreadsheet and corresponding values are automatically calculated.

X1.1.2 Starting at the centerline mark on the lip (d) using a 2 ft (0.6 m) digital level, obtain and record angles (in degrees) progressing every 2 ft (0.6 m) towards the start of the takeoff transition (uphill) until 0° (c) is identified. Mark this point and measure between the lip and zero point using (pulling taut) a tape measure and record the (length) value. Using the digital level or a clinometer, record the angle of the (taut) tape centered between the lip and zero point.

X1.1.3 With a tape measure, measure the length of the top of the takeoff (d-e), the length of the back of takeoff (e-f), and the angle of the back of the takeoff (e-f) and record these values.

X1.1.4 Determine the starting point of the landing (h) and mark this point at centerline. Measure the distance and angle between the lip and the start of the landing (d-h) utilizing the same method as used in measuring the takeoff and record these values.

X1.1.5 Measure and record the width of the lip (d) and the width of the start of the landing (g).

X1.1.6 Determine the angle and length of the landing (h-i) and record these values.

X1.1.7 Measure width of the bottom of the landing (i) and record this value.

X1.1.8 Measure length and angle of the underlying parent slope (c-j) and record these values.

X2. DIGITAL LEVEL METHOD

X2.1 Before measuring, calibrate the digital level according to the manufacturer's instructions.

X2.2 Measure the uphill (approach) segment first beginning at and proceeding uphill from the lip (takeoff point d), at (x,y) coordinates (0,0). Lay the digital level adjacent to the tape measure on the snow surface avoiding surface irregularities. Angles with the downhill end of the level higher than the uphill end (for example, on the takeoff ramp near the takeoff point) are considered to be positive. Similarly, angles with the downhill end of the level lower than the uphill end (for example, on the landing surface beyond the knuckle) are considered to be negative. Associate the measurement of the angle with the position of the center of the level, not either end. Tabulate the sequence of tape measure positions (-1, -3, -5, …) feet, measuring the associated angle at each position, moving the level 2 ft (0.6 m) uphill at each station. Continue angle measurements until the highest Point a is reached.

X2.3 Measure the downhill (landing) segment second beginning at and proceeding downhill from the takeoff point located at (x,y) coordinates (0,0). Tabulate the sequence of positions (+1, +3, -5, …) feet together with the associated angles at each position, moving the level 2 ft (0.6 m) downhill at each station. Continue angle measurements until the lowest Point j is reached. Enter measurements on the ASTM Jump Measurement Form Tape Format.

X2.4 Use the spreadsheet program, JumpProfileTool_ 4.1.xlsm, to convert the sequence of angle versus position measurements to (x,y) coordinates.

X2.5 Merge the uphill and downhill list of coordinates into a single file and sort on x from lowest to highest. Plotting y versus x should yield an image of the jump surface shape as seen from the jumper's right.