

## 2-HETAP Measurements Visuals



### Making the Measurements Objectives

- Learn techniques for making measurements
- Describe where and when measurements are taken on the trail

### Measurements Goals

- Consistent techniques
- Accurate records
- Standardized methods
- Typical and extreme data
- Spectrum of information



### Key HETAP Concepts

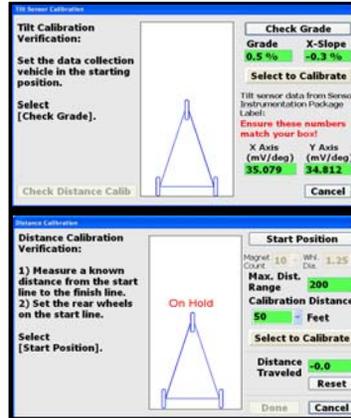
- Divide trail into segments
- Measure best path of travel
- Record many stations



## 2-HETAP Measurements Visuals

### Where to Take Stations

- Visual change in trail direction
- Visual change in grade or cross slope
- Significant change in tread width
- Surface type change
- Trail intersection
- Start and end of trail segment
- No more than 25 feet apart



### Calibration

Always calibrate for grade, cross slope and distance before each trail assessment

### Typical Tread Width - tape measure

Clear path of travel or visible trail surface



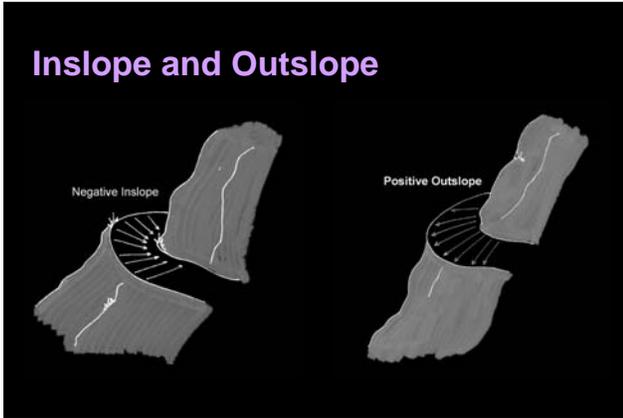
Take a new station whenever there is a significant change in tread width

### Typical Cross Slope

- 2 ft. space perpendicular to path of travel
- Best path of travel
- Records to nearest .1%
- Record inslope as negative (-%)



## 2-HETAP Measurements Visuals



### ADA Compliance

- Proposed guidelines available at [www.access-board.gov](http://www.access-board.gov)
- Recreation trails
- Outdoor recreation access routes
- Picnic and campground facilities
- Beach access

### Trails

#### Grade

Between 1:20 (5%) and 1:12 (8.33%),  
200 feet maximum

Between 1:12 (8.33%) and 1:10 (10%),  
30 feet maximum

#### Cross Slope

1:20 (5%) maximum unless concrete,  
asphalt or boards, then 1:48 (2%)

### Outdoor Recreation Access Routes

#### Grade

Between 1:20 (5%) and 1:12 (8.33%), 50  
feet maximum

Between 1:12 (8.33%) and 1:10 (10%),  
30 feet maximum

#### Cross Slope

1:33 (3%) maximum unless concrete,  
asphalt or boards, then 1:48 (2%)

## 2-HETAP Measurements Visuals

### Outdoor Recreation Access Route

#### Surface

firm and stable

#### Width

36 inches

exception 32 inches for up to 24 inches

#### Openings

< 0.5 inch sphere

### Alarm Thresholds

Alarm Settings

Enable Alarms and Set Alarm Thresholds

**Grade**  
Alarm Enabled   
Limit (%) 8  
Limit Type  
 Amount of Change  
 Absolute Percent

**Cross Slope**  
Alarm Enabled   
Limit (%) 5  
Limit Type  
 Amount of Change  
 Absolute Percent

**Distance**  
Alarm Enabled   
Feet 35

**Outslope to Inslope Changes**  
Alarm Enabled

Done Cancel

Threshold numbers can be set for compliance with accessibility guidelines

### Surface Firmness Category

Paved  
Hard  
Firm  
Soft  
Very Soft



### Rotational Penetrometer

Objective surface measurement device

Draft Standard for measure of firmness and stability under development

Available from Beneficial Designs



## 2-HETAP Measurements Visuals

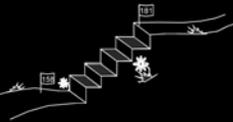
**What are some examples of surface material types?**

### Surface Type

Examples:

Aggregate	Shell
Asphalt	Soil
Crushed Stone	Snow
Grass	Water
Sand	Wood chip

### Stairs and Ladders



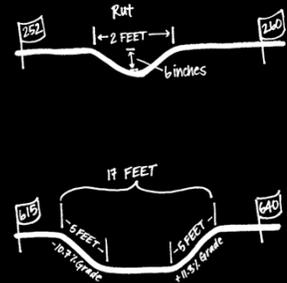
- Stairs recorded as a surface type “stairs” or ladders
- Record station at beginning and end
- Grade not in typical grade calculation
- Also record as a feature
- Recommend to disclose on TAI reports
- Single or long/deep steps only recorded as features

### Ruts and Bumps, Dips and Mounds

Measure wherever there is a visual change in the grade

Also record as a feature

Where would you record a station here?



## 2-HETAP Measurements Visuals

### Minimum Clearance Width - tape measure

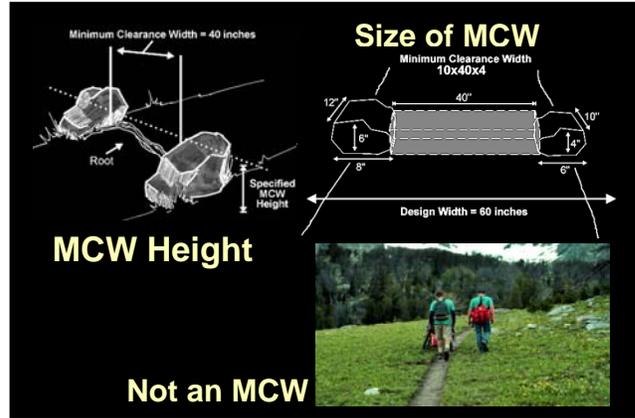
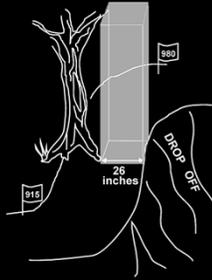
Measure when obstructions on both sides of trail reduce tread to less than the design width

Specified obstruction height based on trail user group

No alternative path around the constriction

Size is L x W x H of clear path

Record features that create MCW



### Suggested MCW Heights

0.25"	Shared use path/bike path
0.5"	Access Route
1.0"	Outdoor Recreation Access Route
2" - 3"	Accessible recreation trail
6" - 8"	Pedestrian recreation trail
12"	Equestrian trail
Vary	Snow/Ski/Snow machine trail

### Features

Natural or human made

On, accessed, or seen from the trail



## 2-HETAP Measurements Visuals

### What are some examples of features?



User enjoyment and comfort



Construction and maintenance



Health and Safety

### Recording Features



**Location** – auto recorded from start of segment  
**Zone** - trail bed or visual field  
**Feature Information** - type and description  
**Size, Quantity and Units** - L x W x H  
**Obstruction** - measure remaining tread

### Feature Information

Type and Description  
e.g., Tree - Torrey Pine

Actions (trained personnel)  
e.g., construct, monitor, rehab

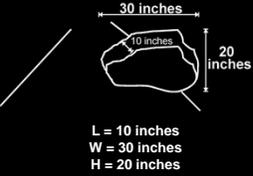
Accessibility  
feature or facility built to accessible standards



### Size and Quantity

Length x Width x Height

- Length parallel
- Width perpendicular
- Height is vertical



All three recorded in inches or feet  
Count for repeated features

## 2-HETAP Measurements Visuals

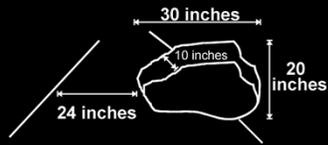
### Tread Obstructions

Feature on the trail tread

Height exceeds the specified tread obstruction height

Record the feature type and dimensions

Remaining tread is space around the obstruction



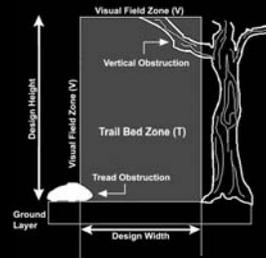
### Zone

#### Trail Bed Zone

- visible right-of-way
- smaller of tread or design width
- height based on user groups or design height
- may vary by season

#### Visual Field Zone

- outside Trail Bed Zone
- easily accessed from trail
- significant features visible from trail



### Obstructions

Features in the Trail Bed Zone that may be a barrier or hazard to users

Two types of obstructions - tread and vertical

Objects easily pushed out of the way are not obstructions



### Vertical Obstructions

Feature overhanging or lateral to the trail that does not contact the tread

Feature type is vertical obstruction

Size is the dimensions of the clear passage space underneath the obstruction

Remaining tread is space beside the obstruction



## 2-HETAP Measurements Visuals

### Multiple Features



Access barriers or hazards may result when two or more moderate features occur at the same point  
Record as "Hazard" in the feature section

#### Examples

tread obstruction & very soft surface  
max. grade & max. cross slope  
max. cross slope towards a drop off  
max. grade & soft surface

### Measurements Summary

Keep the HETAP goals in mind during all assessments to guide your decisions

Measure the best path of travel

Accurately represent the conditions that the user will be required to negotiate

Always record a station when in doubt

Land manager determines feature detail but recommend recording as much as possible

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*Working toward universal access  
through research, design & education*

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