INTERNATIONAL MOUNTAIN BICYCLING ASSOCIATION AUSTRALIA

IMBA Australia

Trail Difficulty Rating System

2014
Version 2.0

SPEAK BUILD RESPECT RIDE

1.0 Background and History

The development and formal acceptance of an Australian Mountain Bike Trail Difficulty Rating System (TDRS) was borne out of a number of identified needs. These include:

- Requests from land managers for a formal and "approved" Australian trail classification standard, as a risk mitigation strategy.
- The need to further clarify aspects of the existing IMBA TDRS to account for additional trail characteristics such as exposure, suitability and a range of gradients or widths.

2.0 Development of the IMBA Australia TDRS

A panel of people involved in the building and management of trails was formed by MTBA, with the task of leading the development of version 1 of the TDRS at the 5th Biennial National Tracks and Trails conference in March 2008. This panel comprised of the following people:

Rod Annear WA, Nick Bowman SA, Reece Guihot ACT, Chris Maierhofer QLD, Gillian Duncan, President MTBA

Using the original IMBA TDRS as the basis for the revised version, the following enhancements have been made:

1. Two versions of the TDRS have been developed; One version for the land manager, which includes quantitative measures against criteria such as trail gradient and width; and a second version for users, replacing quantitative measures with descriptions (e.g. describe slope rather than define as a % gradient)
2. TDRS (both versions) include a general description for the types of features a user might expect to encounter for a given classification.
3. Guidance around the types of bikes suitable for the trail, and the fitness level and experience required of the rider, have been included in the TDRS.
4. Changes to some of the criteria to replace exact numbers with ranges, specifically around the average trail grade (recommended by Joey Klein, IMBA Trail Specialist).

3.0 Table of Contents

4.0 Trail Difficulty Rating System

The IMBA Trail Difficulty Rating System is a basic method used to categorise the relative technical difficulty of recreational trails.

The IMBA Trail Difficulty Rating System can:

- Help trail users make informed decisions
- Encourage visitors to use trails that match their skill level
- Manage risk and minimise injuries
- Improve the outdoor experience for a wide variety of visitors
- Aid in the planning of trails and trail systems

This system was adapted from the international Trail Marking System used at ski areas throughout the world. Many trail networks use this type of system, most notably resort-based mountain biking trail networks. The system best applies to mountain bikers, but is also applicable to other visitors such as hikers and equestrians. These criteria should be combined with personal judgement and trail-user input to reach the final rating.

5.0 Trail Rating Guidelines

5.1 Rate Technical Challenge only.

The system focuses on rating the technical challenge of trails, not the physical exertion. It is not practical to rate both types of difficulty with one system. Consider for, example smooth, wide trails that is 20 kilometres long. The technical challenge of the trail is easy, yet the distance would make the physical exertion difficult. The solution is to independently rate technical challenge and indicate the physical exertion by posting the trail length, and possibly even elevation change.

5.2 Collect Trail Measurements

Use the accompanying table and collect trail measurements for each criterion. There is no prescribed method for tallying a "score" for each trail. Evaluate the trail against the table and combine with judgement to reach the final rating. It is unlikely that any particular trail will measure at the same difficulty level for every criterion. For example, a certain trail may rate as a green circle in three criteria, but a blue square in two different criteria.

5.3 Include Difficulty and Trail Length on Signs and Maps.

Trail length is not a criterion of the system. Instead, trail length should be posted on signs in addition to the difficulty symbol. A sign displaying both length and difficulty provides lots of information, yet it is simple to create and easy to understand.

Likewise, elevation change is not a criterion. The amount of climbing on a trail is more an indicator of physical exertion than technical difficulty. Mountainous regions may consider including the amount of climbing on trail signs.

5.4 Use Good Judgment.

It is acknowledged that there is some subjectivity in evaluating the difficulty of trails, however the aspiration is to achieve consistency in difficulty ratings across Australia. Rating a trail is not 100 percent objective. It's best to combine tangible data with subjective judgment to reach the final rating. For example, a trail may have a wide range of tread surfaces - most of the trail is easy, but some sections are more difficult. How would you rate it? Use your personal experience to consider all elements and select a rating that best matches the style of trail.

5.5 Consider Other Trail Qualities.

Don't forget to consider trail qualities beyond the objective criteria. A wide variety of features could contribute to a trail's difficulty. For example, exposure - the feeling of empty space next to and below the trail tread - provides an added psychological challenge beyond the steepness or roughness of the trail. A 10cm rock seems like a boulder when a 15metre drop looms on your side! Other qualities to think about are corridor clearance and turn radius.

5.6 Use Common Sense and Seek Input.

No rating system can be totally objective or valid for every situation. This system is a tool to be combined with common sense. Look at trails with a discerning eye, and seek input from trail users before selecting the rating. Remember, a diverse trail network with a variety of trail styles is a great way to ensure happy visitors. Provide both easy and difficult trails to spread visitors and meet a range of needs. By indicating the length and difficulty of trails with a clear signage system, visitors will be able to locate their preferred type of trail easily.

5.7 Include Trail Filters and Qualifiers

The first obstacle or technical trail feature on any trail should be visible at the start of that trail and we call this a "trail filter". This trail filter or qualifier should be as difficult, if not more difficult than any of the obstacles on that entire trail with the intention of clearly informing trail users of the characteristics of that trail before they start riding it.

6.0 Criteria to Consider

6.1 Tread Width

The average width of the active tread or beaten path of the trail, where 95% of riders travel.

6.2 Tread Surface

The material and stability of the tread surface is a determining factor in the difficulty of travel on the trail. Some descriptive terms include: hardened (paved or surfaced), firm, stable, variable, widely variable, loose and unpredictable.

6.3 Trail Grade (maximum and average)

Maximum grade is defined as the steepest section of trail that is more than approximately 3 meters in length and is measured in percent with a clinometer. Average grade is the steepness of the trail over its entire length. Average grade can be calculated by taking the total elevation gain of the trail, divided by the total distance, multiplied by 100 to equal a percent grade.

6.4 Natural Obstacles and Technical Trail Features

Objects that add challenge by impeding travel. Examples include: rocks, roots, logs, holes, ledges, drop-offs, etc. The height of each obstacle is measured from the tread surface to the top of the obstacle. If the obstacle is uneven in height, measure to the point over which it is most easily ridden.

Technical Trail Features are objects that have been introduced to the trail to add technical challenge. Examples include: rocks, logs, elevated bridges, teeter-totters, jumps, drop-offs, etc. Both the height and the width of the technical trail feature are measured.

6.5 Assessing the Level of Exposure

This element of trail difficulty can be widely variable, as it relates to the "sense of exposure" experienced by a rider who is travelling along a trail. Trails on steep side slopes can present the possibility and perception of falling a long way down the side of the trail should there be an accident, particularly if there is little vegetation along the trail. In many instances people from the "mountains" and hilly country are often accustomed to steep grades and high levels of exposure, while folks living in gentle country and flat areas can be quite intimidated by trails on steep side slopes. So again trails need to be assessed on their individual merits whereby high levels of "exposure" maybe appropriate in one region or with particular land managers, yet not suitable in other circumstances. Most importantly, this manual is intended to be a guide only and not stipulate that "Easy" and "More Difficult" trails cannot be developed in steep terrain. For example, wider trails on steep slopes may help to make trail users feel safer and also reduce the chance of a serious fall.

7.0 Trail Difficulty Rating System - User Guide

	Easiest  White Circle	Easy  Green Circle	More Difficult  Blue Square	Very Difficult  Single Black Diamond	Extremely Difficult  Double Black Diamond
Description	Likely to be a fire road or wide single track with a gentle gradient, smooth surface and free of obstacles. Frequent encounters are likely with other cyclists, walkers, runners and horse riders.	Likely to be a combination of fire road or wide single track with a gentle gradient, smooth surface and relatively free of unavoidable obstacles. Short sections may exceed these criteria. Frequent encounters are likely with walkers, runners, horse riders and other cyclists.	Likely to be a single trail with moderate gradients, variable surface and obstacles.	Likely to be a challenging single trail with steep gradients, variable surface and many obstacles.	Extremely difficult trails will incorporate very steep gradients, highly variable surface and unavoidable, severe obstacles.
Suitable for	**NEWBIE** Total beginner/ novice cyclists. Basic bike skills required. Suitable for most bikes.	**BEGINNER** Beginner/ novice mountain bikers. Basic mountain bike skills required. Suitable for off-road bikes.	**INTERMEDIATE** Skilled mountain bikers. Suitable for mountain bikes.	**ADVANCED** Experienced mountain bikers with good skills. Suitable for better quality mountain bikes.	**EXPERT** Highly experienced mountain bikers with excellent skills. Suitable for quality mountain bikes.
Fitness Level	Most people in good health.	Most people in good health.	A good standard of fitness.	Higher level of fitness.	Higher level of fitness.
Trail Width	Two riders can ride side by side.	Shoulder width or greater.	Handlebar width or greater.	Can be less than handlebar width.	Can be less than handlebar width.
Trail Surface and obstacles	Hardened with no challenging features on the trail.	Mostly firm and stable. Trail may have obstacles such as logs, roots and rocks.	Possible sections of rocky or loose tread. Trail will have obstacles such as logs, roots and rocks.	Variable and challenging. Unavoidable obstacles such as logs, roots, rocks drop-offs or constructed obstacles.	Widely variable and unpredictable. Expect large, committing and unavoidable obstacles.
Trail Gradient	Climbs and descents are mostly shallow.	Climbs and descents are mostly shallow., but trail may include some moderately steep sections.	Mostly moderate gradients but may include steep sections.	Contains steeper descents or climbs.	Expect prolonged steep, loose and rocky descents or climbs.

8.0 Trail Difficulty Rating System Land Managers Guide

	Easiest  White Circle	Easy  Green Circle	More Difficult  Blue Square	Very Difficult  Single Black Diamond	Extremely Difficult  Double Black Diamond
Description	Likely to be a fire road or wide single track with a gentle gradient, smooth surface and free of obstacles. Frequent encounters are likely with other cyclists, walkers, runners and horse riders.	Likely to be a combination of fire road or wide single track with a gentle gradient, smooth surface and relatively free of obstacles. Short sections may exceed these criteria. Frequent encounters are likely with other cyclists, walkers, runners and horse riders.	Likely to be a single trail with moderate gradients, variable surface and obstacles. Dual use or preferred use Optional lines desirable	Likely to be a challenging single trail with steep gradients, variable surface and many obstacles. Single use and direction Optional lines XC, DH or trials	Extremely difficult trails will incorporate very steep gradients, highly variable surface and unavoidable, severe obstacles. Single use and direction Optional lines XC, DH or trials
Trail Width	2100mm plus or minus 900mm	900mm plus or minus 300mm for tread or bridges.	600mm plus or minus 300mm for tread or bridges.	300mm plus or minus 150mm for tread and bridges. Structures can vary.	150mm plus or minus 100mm for tread or bridges. Structures can vary.
Trail Surface	Hardened or smooth.	Mostly firm and stable.	Possible sections of rocky or loose tread.	Variable and challenging.	Widely variable and unpredictable.
Average Trail Grade	Climbs and descents are mostly shallow. Less than 5% average.	Climbs and descents are mostly shallow, but may include some moderately steep sections. 7% or less average.	Mostly moderate gradients but may include steep sections. 10% or less average.	Contains steeper descents or climbs. 20% or less average.	Expect prolonged steep, loose and rocky descents or climbs. 20% or greater average
Maximum Trail Grade	Max 10%	Max 15%	Max 20% or greater	Max 20% or greater	Max 40% or greater
Level of Trail Exposure	Firm and level fall zone to either side of trail corridor	Exposure to either side of trail corridor includes downward slopes of up to 30%	Exposure to either side of trail corridor includes downward slopes of up to 50%	Exposure to either side of trail corridor includes steep downward slopes or freefall	Exposure to either side of trail corridor includes steep downward slopes or freefall

Natural Obstacles and Technical Trail Features (TTFs)	No obstacles.	Unavoidable obstacles to 50mm (2") high, such as logs, roots and rocks. Avoidable, rollable obstacles may be present. Unavoidable bridges 900mm wide. Short sections may exceed criteria.	Unavoidable, rollable obstacles to 200mm (8") high, such as logs, roots and rocks. Avoidable obstacles to 600mm may be present. Unavoidable bridges 600mm wide. Width of deck is half the height. Short sections may exceed criteria.	Unavoidable obstacles to 380mm (15") high, such as logs, roots, rocks, drop-offs or constructed obstacles. Avoidable obstacles to 1200mm may be present. Unavoidable bridges 600mm wide. Width of deck is half the height. Short sections may exceed criteria.	Large, committing and unavoidable obstacles to 380mm (15") high. Avoidable obstacles to1200mm may be present. Unavoidable bridges 600mm or narrower. Width of bridges is unpredictable. Short sections may exceed criteria.

9.0 Glossary of Terms

Fall zone: The area on either side of or below a technical trail feature that provides a clears landing for a rider who has failed to negotiate an obstacle.

Gradient: The amount of elevation change between two points over a given distance expressed as a percentage (metre change in elevation for every 100 horizontal metres, commonly known as "rise over run"). A trail that rises 7 vertical meters in 100 horizontal metres has a 7% gradient.

Unavoidable obstacles: Obstacles in the trail that must be navigated or attempted without leaving the trail corridor. In some cases riders may lift their bike over these obstacles.

Rollable: an obstacle that is designed and built to allow a bike wheel to simply roll over the obstacle without lifting off the ground or any major gaps in the trail tread.

Single trail: A trail so narrow that users must generally travel in single file.

Slope: The natural (or man-made) pitch of the land, as shown on contour map. Generally refers to the hill, not the trail, as "trail slope" is called gradient.

Trail corridor: The full dimensions of the trail, including the area on either side of the tread and the space overhead that needs to be cleared of brush and obstacles.

Trail ceiling: Full height of the trail corridor, i.e. overhead clearance

9.1 Other Trail Definitions

Tread: The actual surface of the trail upon which users travel.

Back-slope: the portion of the trail located above the tread. 1:1 – 1:3

Grade: Slope expressed as a percentage.

Critical Points: lower edge of tread, upper edge of back-slope

Fall Line: The prevailing slope and the direction water will naturally flow.

Side-slope: The natural slope of a hillside measured on the fall line.

Average Trail Grade: The average slope of the trail from one end to the other. Also called *overall trail grade*. Note: if it's a loop its 0%, divide into sections for more accuracy.

Average Trail Section Grade: The average slope of a certain trail section or segment.

Half Rule: A trail's grade shouldn't exceed half the grade of the side-slope. If the trail grade is steeper than half the grade of the side-slope, it is considered a fall-line trail.

15% Rule - Maximum Trail Grade: The steepest trail slope that is longer than approximately 3 meters.

10% Rule - Average Trail Grade Guideline: Generally, an *average* trail grade of 10 percent or less is the most sustainable. Adjust accordingly for difficulty levels.

Grade Reversal: A reverse in the trail grade—usually a short dip followed by a rise—that forces water off the trail.

Out-slope: A method of tread construction that leaves the outside edge of a hillside trail lower than the inside, in order to shed water in sheet flow.