

HARD GROUND PROTOCOL

Rugby Union - All Ages - Training & Matches

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1. Purpose and Scope

This protocol provides guidance for coaches, team managers, medical personnel, and club officials on how to assess ground hardness and modify training and match activity accordingly. It applies to all rugby union activity - including training sessions, fixtures, and festivals - on natural turf pitches.

Key principle: Player safety is paramount at all times. A pitch that is too hard represents a significant injury risk in contact sport. This protocol provides a structured framework for decision-making, but does not replace the judgement of the responsible person on the day.

Where there is uncertainty, consider applying the more cautious level of restriction and, where significant doubt remains, consider postponing or relocating the activity.

This protocol covers:

- All ages and grades of rugby union player
- Training sessions, competitive fixtures, and festivals
- Natural turf pitches (grass, including dried/hardened surfaces)

It does not cover artificial grass pitches (AGPs), which have their own surface standards under World Rugby Regulation 22.

Disclaimer: This protocol provides general guidance based on current evidence and RFU published materials, and is intended to support - not replace - professional judgement. Individual circumstances, including a player's medical history, injury history, age, fitness level, or pre-existing conditions, may require a different approach to that set out here.

Ground conditions are variable and the assessments described cannot guarantee complete accuracy. The responsible person on the day must use their judgement alongside this framework. Where there remains significant doubt about the suitability of the surface, strongly consider postponing, relocating or appropriately modifying the activity.

Meliora Medical accepts no liability for decisions made on the basis of this guidance.

2. Why Hard Ground Is a Risk in Rugby

Rugby union involves frequent body-to-ground contact: tackles, rucks, scrums, line-outs, and falls. When a natural turf pitch becomes hard - due to drought, frost, or dry weather - the risk profile of all these contacts changes substantially.

The primary concerns are:

- **Impact injuries -**

Harder surfaces may increase the forces experienced during player-to-ground contact and may contribute to greater severity of some impact injuries, including fractures, dislocations and contusions.

- **Concussion risk -**

Harder surfaces may increase the forces experienced during player-to-ground contact and may therefore increase the severity of some head impacts when players fall or are brought to ground.

- **Lower limb injuries -**

Hard or uneven surfaces may alter stud penetration and traction, potentially affecting the forces transmitted through the ankle and knee during changes of direction .

- **Lacerations and abrasions -**

Dried, cracked or compacted turf may increase the likelihood or severity of abrasions and lacerations from sliding or falling. More extensive skin injuries may also carry an increased risk of secondary infection

- **Muscle and tendon stress -**

reduced shock absorption from the ground transfers greater impact force through the lower limb on every running stride, which may contribute to increased lower-limb loading and muscular or tendon stress

3. Pre-Activity Ground Assessment

A ground assessment should be completed before training sessions and matches where hard ground may be a concern. This is the responsibility of the lead coach, team manager, or appointed pitch inspector. Consider documenting the assessment and decision, particularly where **AMBER**, **RED** or **BLACK** conditions are identified.

3.1 Assessment Methods

No single assessment method should be used in isolation. Clegg hammer readings, where available, should be considered alongside the visual inspection, stud or pitchfork assessment, local pitch characteristics and the judgement of those responsible for the activity

Method	How to use it	Concern threshold
Clegg impact hammer	Drop the hammer onto the surface at multiple points across the pitch. Take an average of at least five readings from different areas.	Readings of 75 g or above may indicate increasingly firm or hard ground and should prompt consideration of the corresponding AMBER, RED or BLACK guidance alongside the overall pitch assessment
Stud test	Attempt to insert a standard rugby stud into the ground by hand pressure only. Test multiple areas including centre-field, touchlines, and try lines.	Increasing resistance to penetration should prompt consideration of AMBER or RED guidance. Where there is essentially no penetration across representative areas and the surface feels concrete-like, consider BLACK guidance.
Pitchfork test	Insert a standard pitchfork into the turf. If it requires significant force or cannot penetrate, the surface is hard.	Significant resistance to penetration should prompt consideration of AMBER or higher guidance, taking account of the overall assessment
Visual inspection	Walk the full pitch. Look for cracking, bare patches, scorched markings, and areas of significantly different hardness.	Significant cracking, bare ground, or burned-in marking lines that are harder than surrounds.

3.2 Assessment Checklist

Complete the following checklist before activity. ‘Any ‘Yes’ answer indicates a potential concern and should contribute to the overall traffic-light assessment. The entire playing area should be inspected. Where a localised hazard cannot be adequately rectified before activity, strongly consider using an alternative pitch or modifying, postponing or relocating the activity.

✓	Assessment Question	Concern Indicator
☐	Does a stud fail to penetrate the surface under hand pressure?	Consider AMBER or higher guidance
☐	Does a pitchfork require significant force to penetrate the surface?	Consider AMBER or higher guidance
☐	Is there significant loss of grass cover or exposed/bare ground across parts of the playing area?	Increases injury severity from contact with ground
☐	Is the Clegg hammer reading 75 or above?	Consider AMBER (75–99) or RED/BLACK (100+)
☐	Are there visible cracks in the surface?	Consider AMBER or higher guidance depending on severity and extent
☐	Are pitch marking lines harder or more compacted than surrounding turf?	Consider AMBER guidance and avoiding or rectifying affected areas where possible

☐	Is the pitch showing signs of frost or ice (morning inspections)?	Strongly consider BLACK guidance where frozen or icy areas remain at the time of activity
☐	Are there holes, subsidence, or uneven sections of pitch?	Consider RED or BLACK guidance depending on severity
☐	Concurrent environmental risks: Where hot weather is also a concern, complete the Hot Weather Protocol separately and consider the combined effect of both risks when determining appropriate activity.	Heat compounds hard-ground risk - cross-reference hot weather protocol
☐	Has the pitch grounds person been consulted?	Seek grounds staff input where available

IMPORTANT: The entire playing area should be inspected. Where a localised hazard cannot be adequately rectified before activity, strongly consider using another pitch or modifying, postponing or relocating the activity. Do not rely solely on asking players to avoid a known hazardous area.

3.3 Decision Making

This protocol is intended to support decision-making rather than determine whether activity may or may not take place. The person responsible for the activity should consider the overall pitch assessment, the nature and age group of the activity, anticipated level of contact, grounds staff input, medical advice where available, and the responsibilities of the referee or match officials where applicable.

Relevant current guidance or restrictions issued by England Rugby or other governing bodies should also be considered as part of the overall assessment.

Where different assessment methods indicate different levels of concern, consider applying the more cautious level. Where uncertainty remains, consider modifying, postponing or relocating the activity

4. Hard Ground Traffic Light Framework

The traffic-light framework is intended to support, rather than replace, judgement. Consider the overall condition of the pitch and apply the guidance associated with the highest level of concern identified. No single finding should automatically determine the decision in isolation.

Level	Ground Assessment Criteria	Training & Match Activity	Equipment Requirements
 GREEN	Stud penetrates easily with hand pressure	Training and match activity can normally proceed	Player choice of standard boots (FG or SG as appropriate)
Normal Ground	Pitchfork penetrates with normal effort	Standard warm-up and cool-down	Normal kit

	Good grass coverage throughout Clegg reading < 75 No visible cracking or bare patches	Normal contact and full-intensity play No specific restrictions	Standard protective equipment per player preference
 AMBER Firm Ground	Stud penetrates but requires effort Pitchfork penetrates with noticeable resistance Grass coverage patchy in areas Clegg reading 75–99 Minor surface drying or early cracking visible	Training and matches can normally proceed with additional consideration of ground-related risk. Consider an extended warm-up, including appropriate landing/falling technique where relevant Consider reducing repetitive player-to-ground contact Avoid unnecessary diving or falling drills on particularly hard or bare areas Consider reducing the duration or intensity of high-contact training Maintain increased vigilance for injury and changing surface conditions	Consider firm-ground or moulded footwear where appropriate for the surface. Long metal studs may be less suitable on very firm ground. Players may consider appropriate protective clothing or base layers to reduce discomfort and abrasions; these should not be relied upon to compensate for an unsuitable playing surface Consider encouraging use of base layer to protect against abrasions
 RED Hard Ground/ High Concern	Stud penetration markedly restricted Pitchfork does not penetrate without significant force Extensive loss of grass cover or significant areas of exposed, compacted ground. Clegg reading 100–124 Visible cracking across surface	Strongly consider significant modification of activity. This may include suspending live contact training, replacing contact work with skills-based or non-contact activity, and postponing or relocating competitive matches. Strongly consider suspending live contact and tackle work Consider passing, kicking, tactical and non-contact skills work instead	Consider firm-ground/moulded footwear appropriate to the surface. Avoid relying on footwear modification to compensate for an otherwise unsuitable pitch.

		Consider relocating training or fixtures to a more suitable natural-turf pitch or AGP Where activity continues, undertake and document an individual risk assessment and rationale Consider input from the grounds person, referee, coach/team manager and medical staff where available	
● BLACK Very High Concern	Little or no stud penetration across representative areas; surface may feel concrete-like Surface is concrete-like or frozen Clegg reading ≥ 125 Significant cracking, holes, or subsidence present Any frozen or iced area on pitch	The surface would normally be regarded as unsuitable for rugby activity. Strongly consider postponing, cancelling or relocating training and matches. Strongly consider not using the surface Seek a suitable alternative pitch, AGP or indoor venue Consider postponement or cancellation where relocation is not possible Document the assessment and decision Do not rely on equipment modification alone to mitigate a substantially unsuitable playing surface	Do not rely on equipment modification alone to mitigate a substantially unsuitable playing surface

5. Specific Guidance by Situation

5.1 Boot and Equipment Selection

Footwear selection may influence traction and lower-limb loading on firm or hard ground. Consider footwear appropriate to the surface, taking account of stud penetration, traction and individual player preference.

Boot Type	Description	Hard Ground Suitability
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Soft Ground (SG) - long metal studs	Removable metal studs, 6–8 per boot, designed to penetrate soft turf	✗ May be less suitable on very firm/hard ground because limited stud penetration may alter traction and loading. Consider an alternative boot appropriate to the surface.
Firm Ground (FG) - moulded rubber	Fixed moulded rubber studs, 10–16 per boot, shorter profile, absorbs force across wider area	✓ Often appropriate on firm/hard natural turf. Consider round moulded studs where possible
Astro Turf / Multi-Ground (AG/MG)	Many small moulded rubber studs, designed for artificial turf	✓ May be appropriate on very firm natural turf depending on the specific footwear and playing surface.
Bladed studs (FG variant)	Blade-shaped moulded studs, often seen in backs	⚠ Use with caution on very firm or cracked surfaces. Where appropriate, consider round moulded studs as an alternative

5.2 Warm-Up on Hard Ground

On **AMBER** ground, consider extending the warm-up and incorporating appropriate landing and falling technique before contact activity. On **RED** ground, strongly consider avoiding live contact altogether and using non-contact movement or technique work instead.

Consider incorporating the RFU Activate programme into training on firm or hard ground as part of the wider injury-prevention strategy. Key components relevant to hard ground include:

- Controlled falling practice - coaching how to absorb impact through the arms, tuck the chin, and roll rather than landing flat
- Ankle stability and proprioception exercises - reduces rotational injury risk on unpredictable surfaces
- Landing mechanics - controlled deceleration and landing technique for jumpers and aerial balls
- Hip and core activation - reduces injury risk in tackles and collisions

5.3 Hydration and Heat Interaction

Hard ground conditions most commonly occur during dry, hot weather. . Where hot weather is also a concern, consider applying the Hot Weather Protocol alongside this protocol. The two protocols interact: heat fatigue reduces neuromuscular control, increasing the fall-injury risk that hard ground already elevates.

Complete both assessments independently and consider the combined risk when deciding what activity modifications are appropriate.

5.4 Frost and Winter Hard Ground

Frozen or icy areas may create a particularly unpredictable and hazardous playing surface. Where any part of the playing area remains frozen or icy at the time of activity, strongly consider applying **BLACK** guidance and postponing or relocating activity.

- If the pitch is partially shaded, frozen areas may persist long after the rest of the pitch has thawed - inspect the whole surface
- A pitch that froze overnight and has partially thawed may have hidden icy patches at the base of the grass - test with the stud test in all areas including shaded corners
- A light frost that has fully cleared by kick-off time may leave a temporarily softened, muddy surface - re-assess immediately before activity

6. Alternative Activities for **RED** Ground

Where live contact training has been suspended or significantly reduced because of ground conditions, consider alternative activities that minimise player-to-ground contact:

Activity	Description and benefit
RFU Activate programme	Structured injury prevention exercise programme. Builds stability, proprioception, and movement quality. Fully non-contact and appropriate for all ages.
Fall technique coaching	Technique coaching using mats or another suitable forgiving surface where available. Avoid repetitive deliberate falls directly onto hard ground. See RFU videos: "Coaching falling correctly" (link via RFU coaching hub).
Contact decision-making (non-contact)	Tag rugby, "steal the sock" and "spar the knee" drills as per RFU drought guidance. Develops contact awareness and decision-making without ground impact.
Skills and kicking sessions	Passing, kicking and tactical skills work where the likelihood of uncontrolled player-to-ground contact is low. Activities involving aerial contests or lifting should only be considered where the landing environment is suitably controlled
Video analysis and team meeting	Use the session for tactical review, opposition analysis, or individual feedback - particularly valuable if rescheduling is not possible.
Indoor alternatives	Gym-based conditioning, S&C work, pool sessions. Contact your county or local leisure centre for availability.
AGP relocation	The RFU offers artificial grass pitch bookings via Rugby365@rfu.com. In drought or hard-ground conditions, matches can be relocated to the nearest RFU AGP free of charge (subject to availability).

Sources and references: RFU Natural Turf Pitch Surface Risk Assessment; RFU Community Communications - Managing Pitches in Drought Conditions (2022); World Rugby Playing Environment Guidelines; Association of ground hardness with injuries in rugby union (British Journal of Sports Medicine, PMC2465405).

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Use the overall pitch assessment rather than any single test in isolation. Consider the guidance associated with the highest level of concern identified.

RISK LEVEL	GROUND ASSESSMENT	ACTIVITY GUIDANCE	FOOTWEAR & SURFACE
GREEN Low Concern	Stud: Penetrates easily with hand pressure Visual: No cracking, good give underfoot Clegg: <i>Below 75</i>	• Training and match play can normally proceed • Monitor conditions throughout the session. • Reassess if weather is hot or dry.	• Standard rugby footwear can normally be used as appropriate to the surface . • Check studs regularly during play. • Consider recording the assessment where appropriate.
AMBER Moderate Concern	Stud: Penetrates but with noticeable resistance Visual: Some cracking, minimal give underfoot Clegg: <i>75-99</i>	• Training and matches can normally proceed with precautions • Consider reducing repetitive or unnecessary player-to-ground contact • Consider an extended warm-up • Inspect the entire pitch for localised hazards • Consider shorter or modified contact sessions	• Consider firm-ground/moulded footwear appropriate to the surface • Long metal studs may be less suitable on very firm ground • Consider protective clothing/base layers for abrasion reduction • Monitor and reassess if conditions deteriorate
RED High Concern	Stud: Penetration markedly restricted Visual: Significant cracking, hard and unyielding Clegg: <i>100-124</i>	• Strongly consider suspending live contact and tackle work • Consider non-contact skills, drills and tactical work instead • Strongly consider postponing or relocating competitive matches • Consider relocating to a more suitable pitch or AGP	• Consider firm-ground/moulded footwear appropriate to the surface • Consider input from grounds staff, coach/team manager, referee/match officials and medical staff where available • Document the assessment and rationale where activity continues
BLACK Very High Concern	Stud: Little or no penetration across representative areas; surface may feel concrete-like Visual: Severe cracking or rutting, concrete-like Clegg: <i>125 or above</i>	• Strongly consider not using this surface • Consider postponing, cancelling or relocating training and matches • Seek a suitable alternative pitch or AGP • Record the assessment and decision	• Do not rely on footwear or protective equipment to compensate for a substantially unsuitable surface.

KEY PRINCIPLES: Inspect the entire pitch • Consider the overall assessment • Use the highest level of concern identified • Reassess if conditions change
• Where uncertain, consider the more cautious approach.

DECISION-MAKING: Consider grounds staff, coach/team manager, referee/match officials and medical input where available.
Take account of surface condition, age group, activity and anticipated contact.