

The Play Performance of Six Water Based Field Hockey Pitches: Spatial and Temporal Changes

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Overview

- Study Overview
- Methodology
- Construction Specifications
- Temporal Variation
- Spatial Variation
- Conclusions
- Future Testing

Study Overview

- FIH performance requirements
- Certificate of compliance (2 year duration)
- Manufacturer's products only tested at the beginning of a products life
- Uncertainty as to how a product will perform over time and whether the performance requirements will be sustained, and to what extent.



Study Overview

- Little research into the wear and ageing of synthetic turf pitches and the influence it has on the mechanical behaviour of a pitch.
- Initial work conducted by Young (2005) on six unfilled (water-based) synthetic turf field hockey pitches over a two year period.
- A longer-term study required.
- This study provides additional data relating to the same six pitches after a further period of two years.

Methodology

- Six water based synthetic turf pitches for field hockey were chosen.
- Pitch Criteria:
 - Pitch construction specifications
 - FIH accreditation
 - Pitch age
 - Maintenance regime
 - Usage level
- The mechanical behaviour including stiffness, traction and rebound resilience of each pitch was measured.

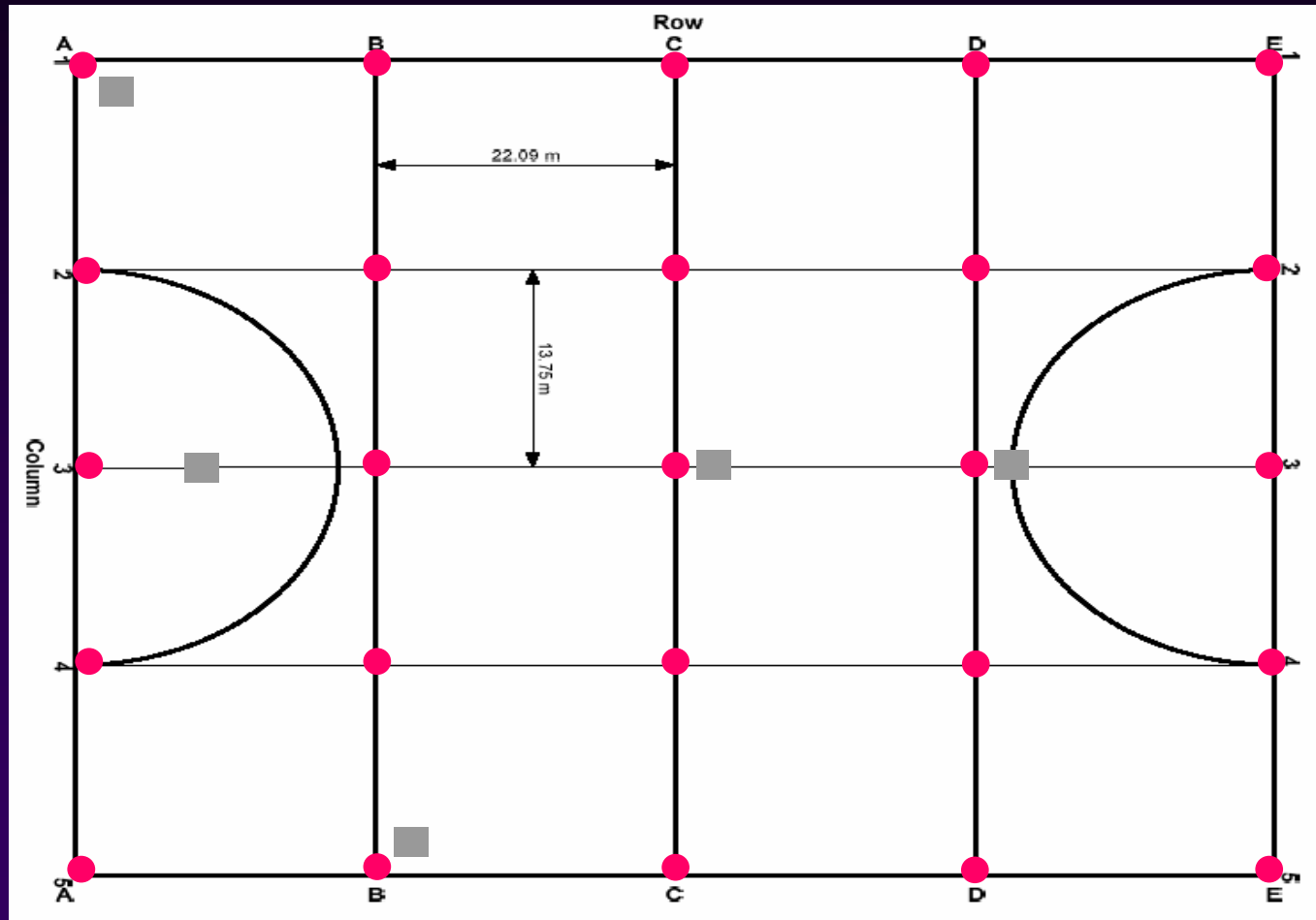
Methodology

- Test Methods:
 - Force reduction (FIH, 1999)
 - Rotational Traction (BS 7044)
 - Ball rebound resilience (FIH, 1999)



Methodology

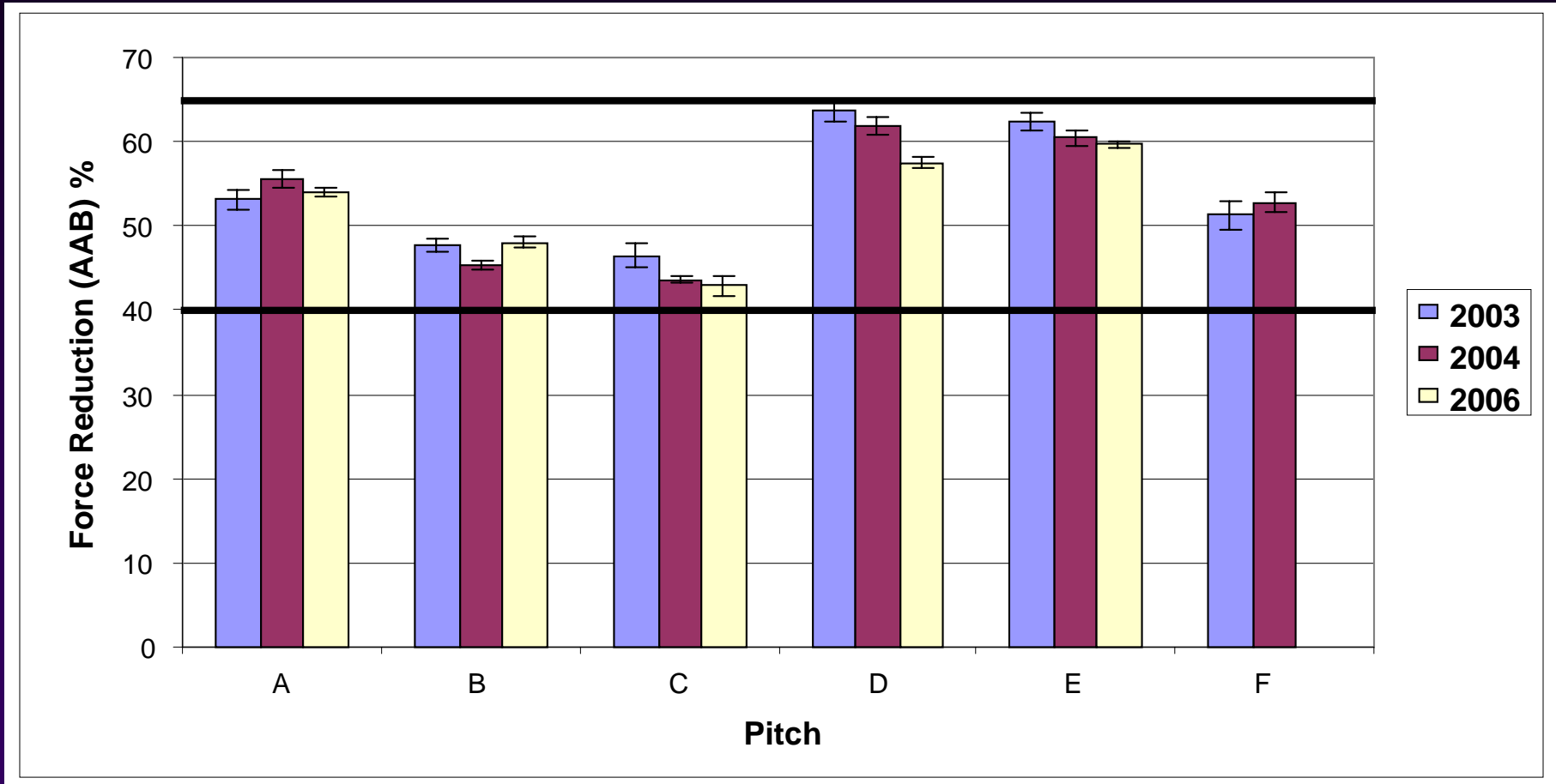
- Test locations
- FIH test locations



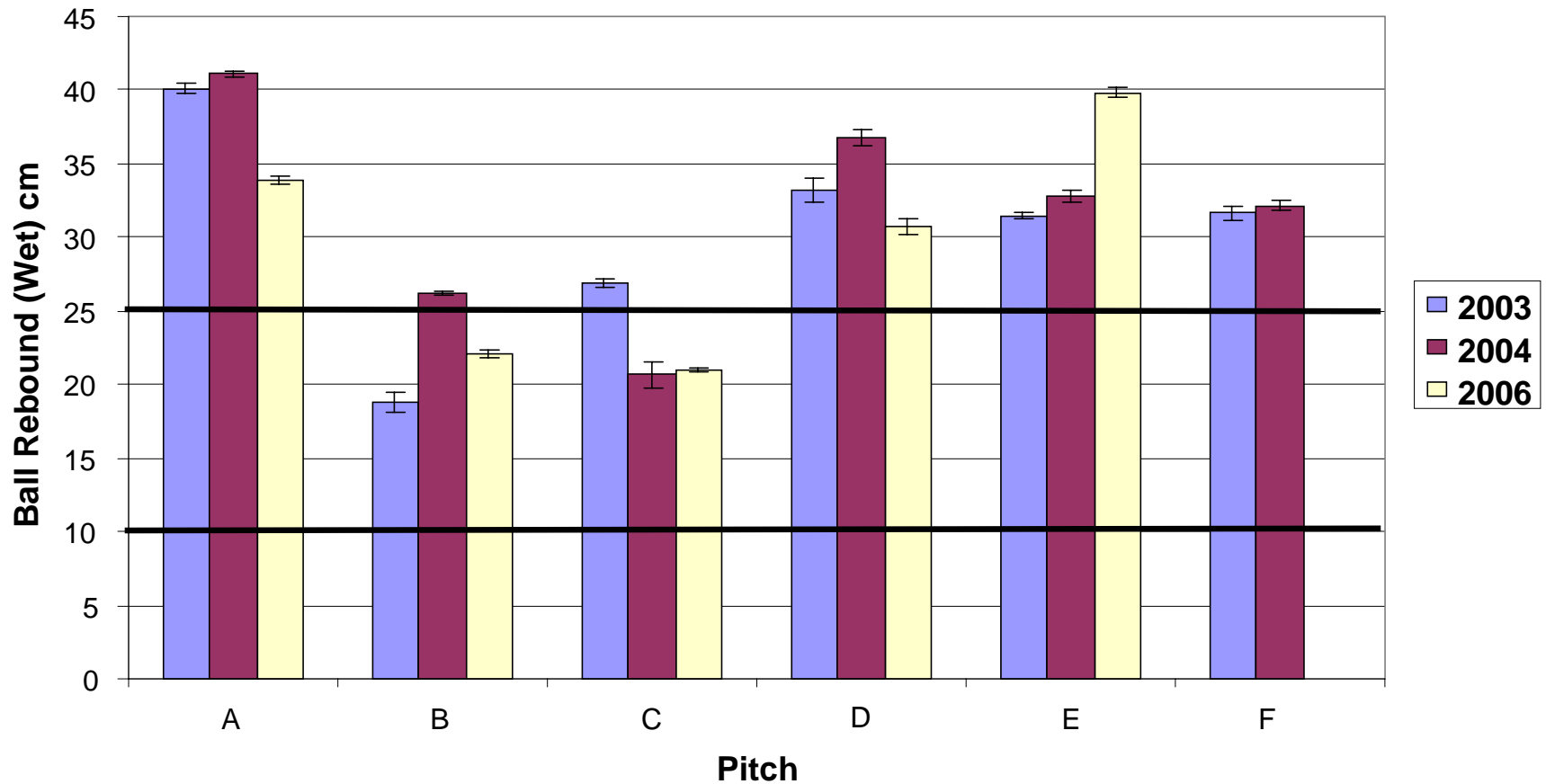
Construction Specifications

- There existed three 'pairs' of pitch with similar shockpad/carpet types.
- **Pitches D and E:** in-situ and integral shockpad with a thickness of 15 mm beneath a nylon Astroturf carpet.
- **Pitches B and C:** an integral shockpad of 6 mm and 8 mm respectively beneath a nylon Astroturf carpet.
- **Pitches A and F:** an in-situ shockpad with a thickness of 15 mm beneath a polypropylene carpet.

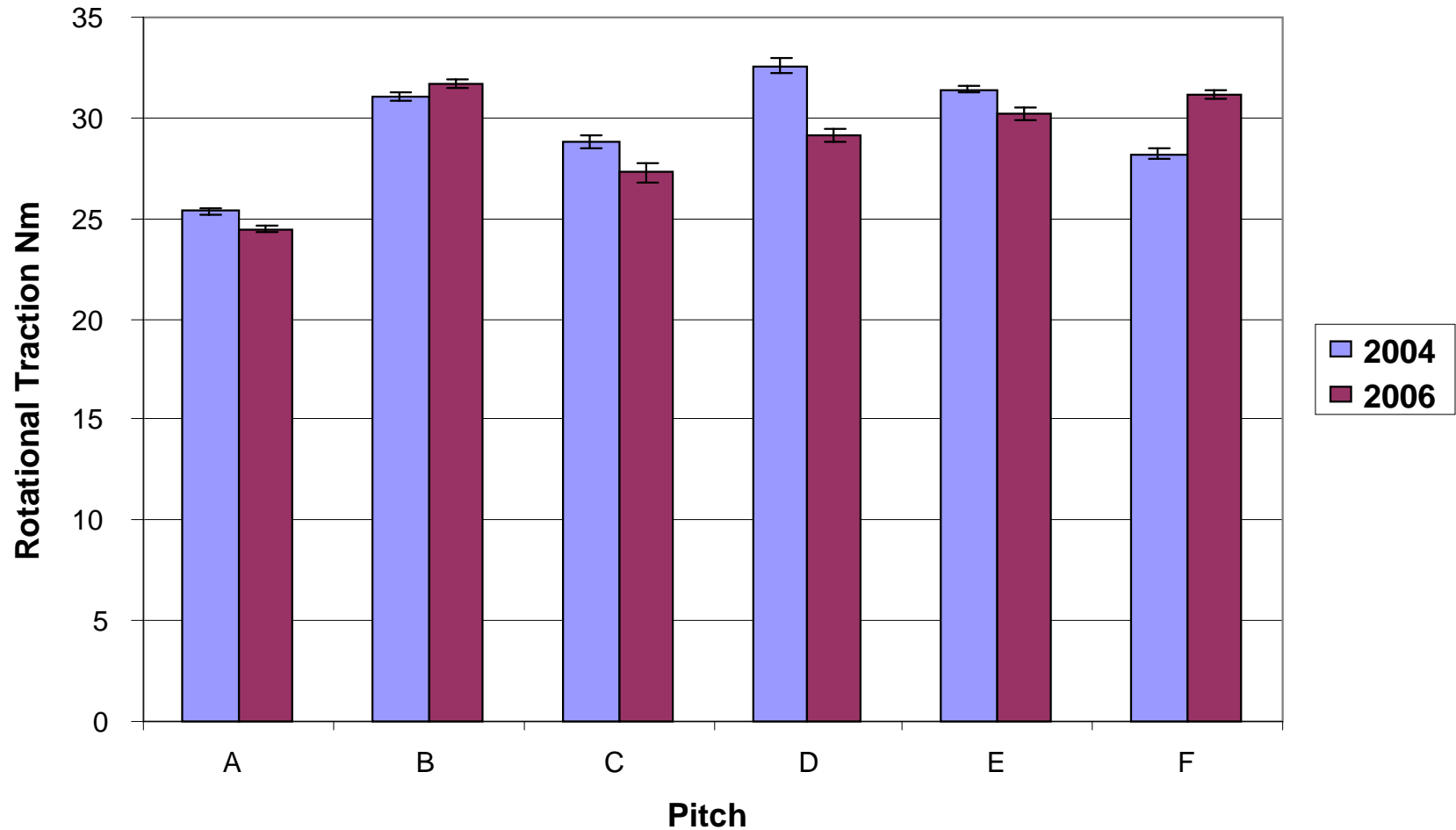
Temporal Variation: Mean Force Reduction



Temporal Variation: Mean Ball Rebound Resilience



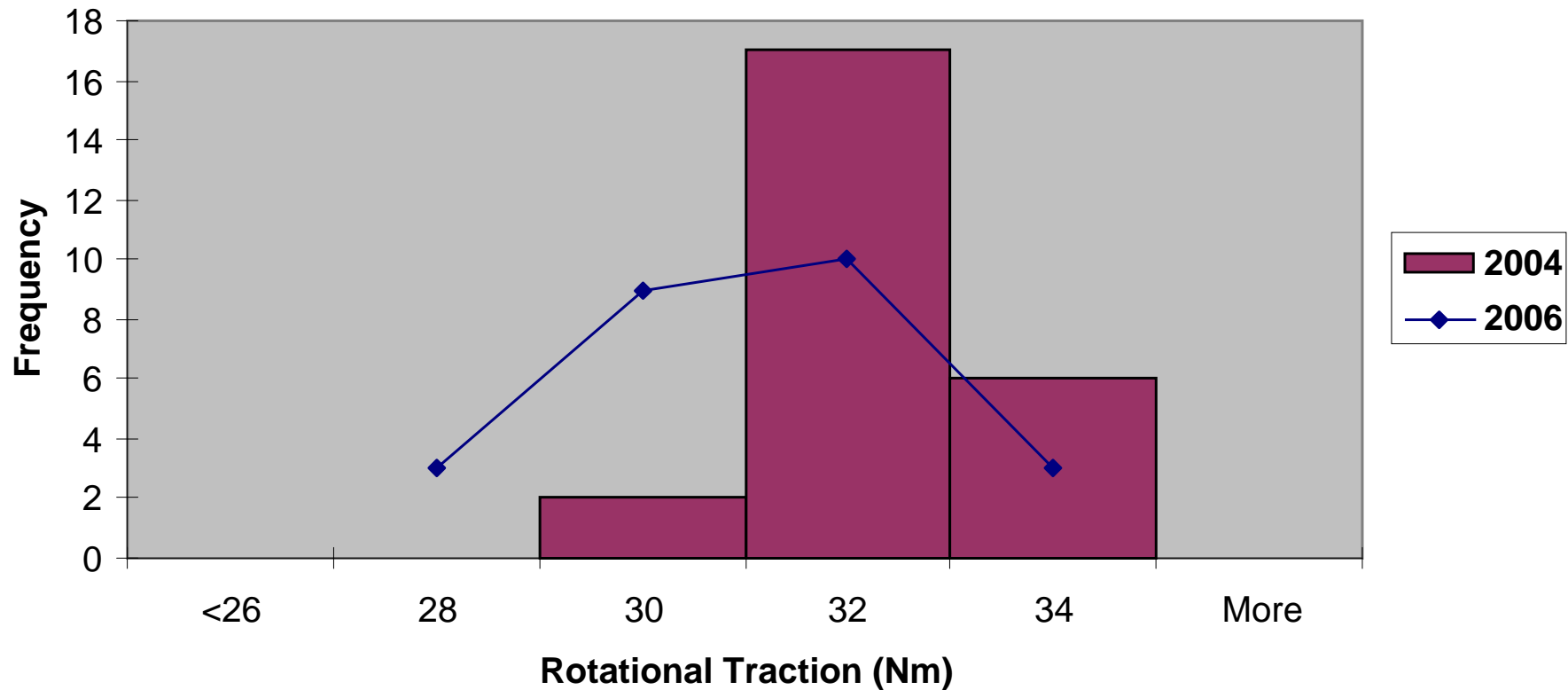
Temporal Variation: Mean Rotational Traction



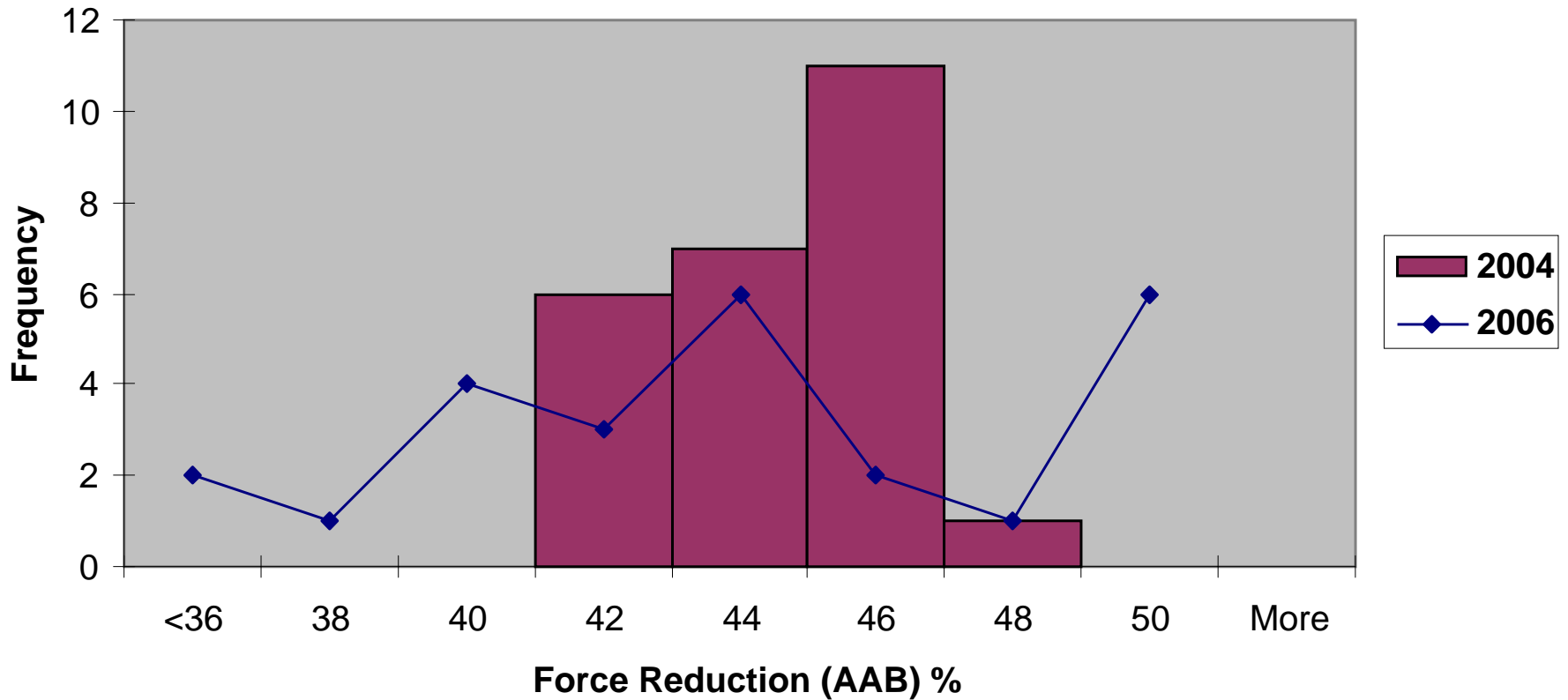
Spatial Variation

- The FIH stipulate individual test location measurements must not deviate from the pitch average by more than a stated amount. This should ensure that a pitch provides a consistent playing surface.
- **Ball Rebound Resilience** (+/- 20% from the average)
 - All pitches met the requirements
- **Force Reduction** (+/- 5% from the average)
 - From the 25 test locations, between 1 and 19 locations per pitch fell outside the requirement in 2004 and 2006.
- **Rotational Traction** (+/- 5% for the purposes of this study)
 - From the 25 test locations, between 2 and 14 locations per pitch fell outside the requirement in 2004 and 2006.

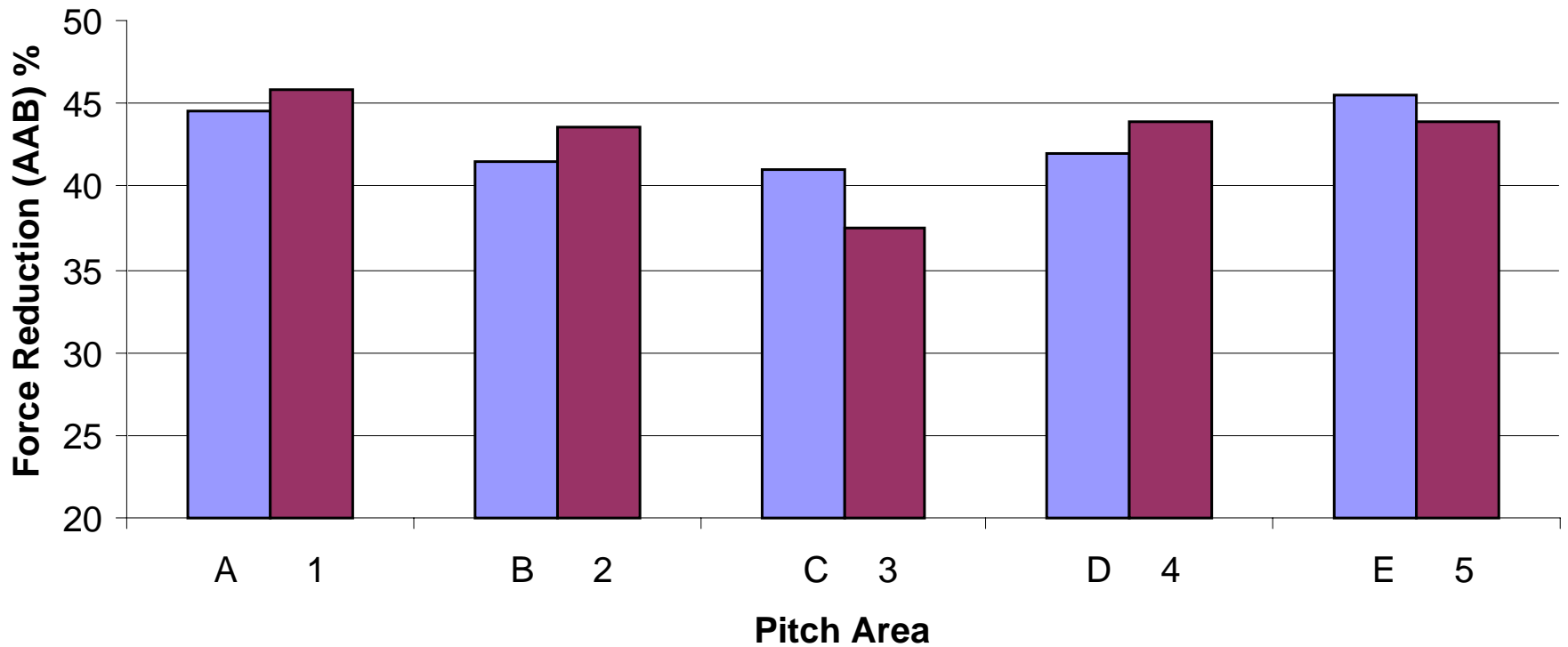
Spatial Variation: Rotational Traction of Pitch E



Spatial Variation: Force Reduction of Pitch C



Spatial Variation: Patterns Emerging from Pitch C



Conclusions

- The mechanical properties of a pitch can and do change with age and usage.
- Spatial variation findings suggest that there are significant variations in mechanical behaviour across a pitch.
- The important role of the shockpad was clearly demonstrated from the measurements and comparisons between the different designs.
- The maintenance regime and its effects are lacking from this study.
- Gaps in regard to detailed assessment of the surface at the test locations restrict these conclusions to a cautionary preliminary assessment.

Future Testing

- Future field testing at these six pitches will permit the database to be extended and the simple wear mechanisms to be better evaluated, dependent on a more objective assessment of the field conditions at the time of testing – with regard to carpet state and ‘wetness’ of the field.

Thank You
Any Questions?