



End report

Visits to German artificial turfs, autumn 2019

Background

The subjective feedback from Norwegian soccer players are that the installed turf systems at Flatås, Råde and Fredrikstad feels slippery and/or hard. Therefore, representatives from six different soccer clubs were invited to Germany to test turf systems with thicker shock-pad, more sand infill and/or with olive infill compared to the systems installed in Norway.

Methods

19 players, playing in 4th or 3rd division in Norway, took part in the tests. All players visited Absteinach and tested the shoes Nike Legend 8 Elite AG- and FG-Pro. Tests were performed during 3 separate visits: on the 1st visit, 5 players from Flatås tested 8 pairs of soccer shoes and visited artificial turf systems at Absteinach and Obersültzen. On the 2nd and 3rd visit, 13 players from Teie IL and Fredrikstad municipality tested 3-4 pairs of soccer shoes and visited Absteinach and Neunkirchen. Absteinach and Obersültzen were tested under dry conditions while Neunkirchen was tested under wet conditions (light rain). Table 1 gives an overview over turf system characteristics.

Table 1. Turf system characteristics. Thickness shock-pad, infill type, mechanical measured rotational torque (Nm) and force reduction (%) for 5 turf systems tested during the autumn 2019. Rotational torque and force reduction were measured according to [FIFA test method 4a and 6](#).

Turf system characteristics				
Field	Thickness shock pad	Infill	Torque	Force reduction
Absteinach	30 mm	Sand	30 Nm	67 %
Obersültzen	30 mm	Sand	35 Nm	65%
Neunkirchen	30 mm	Sand and olive	39 Nm	66%
Flatås	12 mm	Sand	28 Nm	60%
Råde	12 mm	Sand	29 Nm	62%

Protocol

All players performed an individual warm-up, followed by playing, shooting, and passing. After 15-30 minutes, the players changed shoes and gave feedback on shoe-surface interaction using a scale from 1-10. The players wrote their feedback on a form that stated 1 as “very good” and 10 as “worst”. Oral feedback was handwritten by Linda Marie Hansen.

Results - feedback from players

Oral feedback

All players clearly experienced the German turf systems as “less slippery” and “much better” than those installed in Norway. Players from Flatås and Råde stated that the turf system Absteinach and Obersültzen felt much softer than the Norwegian turf systems. All players felt that the shoe-turf interaction is important for traction. One male player found the turf system at Absteinach slippery, regardless of shoes.

Written feedback

Table 2 shows an overview of written feedback from the players (presented as figures in Appendix). From the possible combinations of turf systems and shoes, Neunkirchen and Nike Legend 8 Elite AG-Pro received the best score (Table 2 and Figure 1). Neunkirchen got 15-34% better average score than Absteinach and Obersültzen. Furthermore, Neunkirchen received up to ~50% better score than Absteinach when the players used Nike Legend 8 Elite AG- and FG-Pro and their private shoes.

Out of all shoe types, the players gave the best score to Adidas Nemeziz 18.1 FG, Nike Legend 8 Elite FG-Pro and Adidas Copa 19.1 FG. The 5 players who tested Adidas Nemeziz 18.1 FG and Adidas Copa 19.1 FG did not visit Neunkirchen. Regardless of turf system, Nike Superfly 6 Elite FG got the worst score. Players from Flatås/Råde preferred Obersültzen over Absteinach, regardless of shoe type. Players from Teie/Fredrikstad preferred Neunkirchen over Absteinach for all shoe types except Nike Legend 8 Elite SG-Pro.

Table 2. Overview over feedback from 19 Norwegian soccer players. Evaluation on shoe-turf interaction by 17 male and 2 female soccer players from 6 different Norwegian soccer clubs. 8 shoe pairs and 3 artificial turf systems were evaluated using a scale from 1-10 (1 = “very good” and 10 = “worst”). All values are presented as average \pm standard deviation.

	Absteinach (19 players)	Obersültzen (5 players)	Neunkirchen (14 players)	Avg.
Adidas Nemeziz 18.1 FG (5 players)	3.6 (\pm 2.5)	3.2 (\pm 2.3)		3.4 (\pm 2.3)
Nike Superfly 6 Elite FG (5 players)	8.4 (\pm 1.5)	8.2 (\pm 1.8)		8.3 (\pm 1.6)
Nike Legend 8 Elite AG-Pro (19 players)	5.4 (\pm 2.3)	2.8 (\pm 1.6)	2.6 (\pm 0.9)	4.0 (\pm 2.3)
Nike Legend 8 Elite FG-Pro (18 players)	3.7 (\pm 1.8)	2.8 (\pm 1.5)	3.1 (\pm 1.7)	3.4 (\pm 1.7)
Nike Legend 8 Elite SG-Pro (5 players)	6.7 (\pm 2.3)		6.8 (\pm 1.9)	6.7 (\pm 1.9)
Adidas Copa 19.1 FG (5 players)	3.8 (\pm 1.7)	3.0 (\pm 1.0)		3.4 (\pm 1.7)
Nike Phantom Venom Elite AG-Pro (5 players)	4.2 (\pm 1.6)	3.0 (\pm 1.0)		3.6 (\pm 1.4)
Private shoes (14 players)	6.5 (\pm 1.1)		3.3 (\pm 1.0)	4.9 (\pm 2.0)
Avg.	5.0 (\pm 2.3)	3.9 (\pm 2.6)	3.3 (\pm 1.3)	
Avg. = average value for all players				

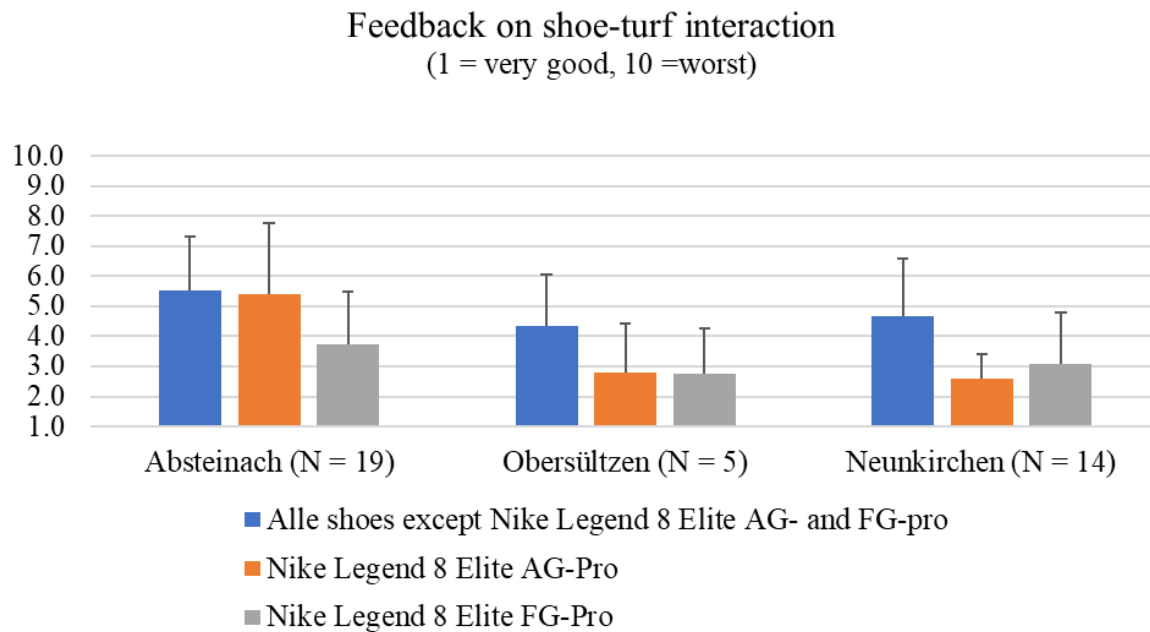


Figure 1. Feedback on shoe-turf interaction by 17 male and 2 female soccer players from 6 different Norwegian soccer clubs using 8 different pairs of shoes at 3 turf systems: Absteinach, Obersültzen and Neunkirchen. The shoe-turf interaction was ranked on a scale from 1-10, 1 being “very good” and 10 “worst”. “N” is the number of players that visited the turf system. All values are presented as average + standard deviation.

Discussion

Compared to the turf systems in Germany, the turf systems at Flatås and Råde have thinner shock-pad and less sand. Turfs at Flatås and Råde had similar rotational torque as, and lower shock absorption than, Absteinach and Obersültzen. However, the players orally expressed that the German turfs felt less slippery. A possible explanation is that rotational torque and shock absorption is measured by a mechanical device that does not necessarily represent human movement. For example, the mechanical device measures the rotational torque for the turf systems as one unit, whereas each layer of the turf system may affect each players judgment of rotational torque. Consequently, the significance of each layer in a turf system on human movement should be measured in future research studies.

The players ranked shoe types within the range of ~3-8, regardless of turf system. The German turf systems had a rotational torque from 30 Nm to 39 Nm. Highest torque was measured at Neunkirchen, which also received the best feedback from players out of the three German turfs.

Shoe type may be an important variable in regard to the subjective feeling of “slippery turf”. However, rotational torque may affect the importance of shoe type (i.e. Norwegian players may feel that a turf with 39 Nm rotational torque are less slippery than a turf with 30 Nm, regardless of shoe type).

It should be noted that the numbers of players that visited each field and tested each shoe type ranged from 5-19. Due to this variety, statistical analysis was not run. This report holds players subjective opinions and is not carried out as a research study. The visits to turf systems and different shoe types were initiated and paid by the supplier of the Norwegian turf systems.

16 January 2020, Trondheim, Norway.

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Appendix

Data from Table 1 presented as figures:

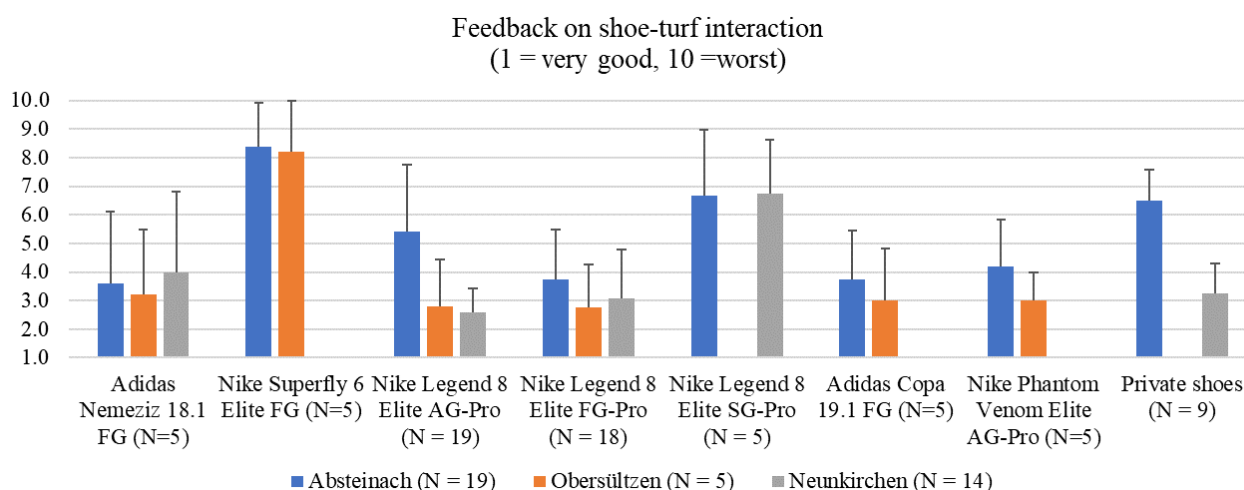


Figure 2. Overview over feedback from 19 Norwegian soccer players. Evaluation on shoe-turf interaction by 17 male and 2 female soccer players from 6 different Norwegian soccer clubs. 8 shoe pairs and 3 artificial turf systems were evaluated using a scale from 1-10 (1 = “very good” and 10 = “worst”). “N” is the number of players that tested the shoe type and visited the turf system. All values are presented as average + standard deviation.

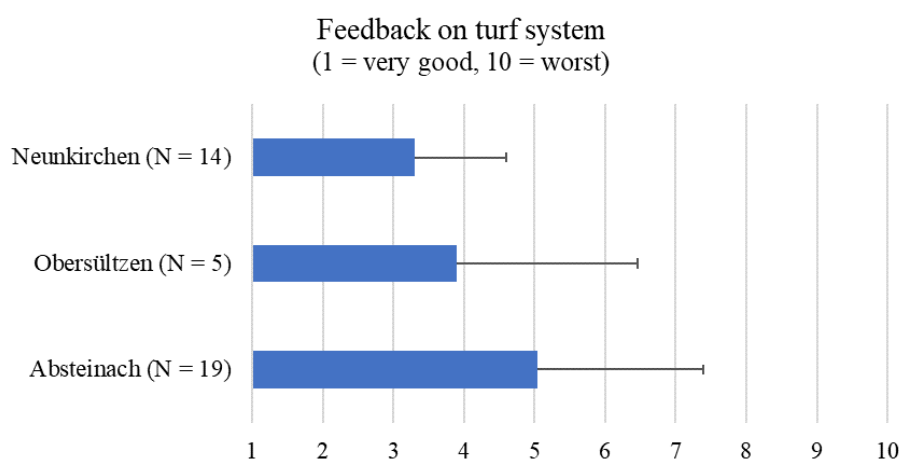


Figure 3. Feedback from 19 Norwegian soccer players on 3 different turf systems. The turf systems were tested with 8 different shoe types. 17 male and 2 female soccer players from 6 different Norwegian soccer clubs scored each shoe type using a scale from 1-10 (1 = “very good” and 10 = “worst”). “N” is the number of players that visited the turf system. All values are presented as average + standard deviation.

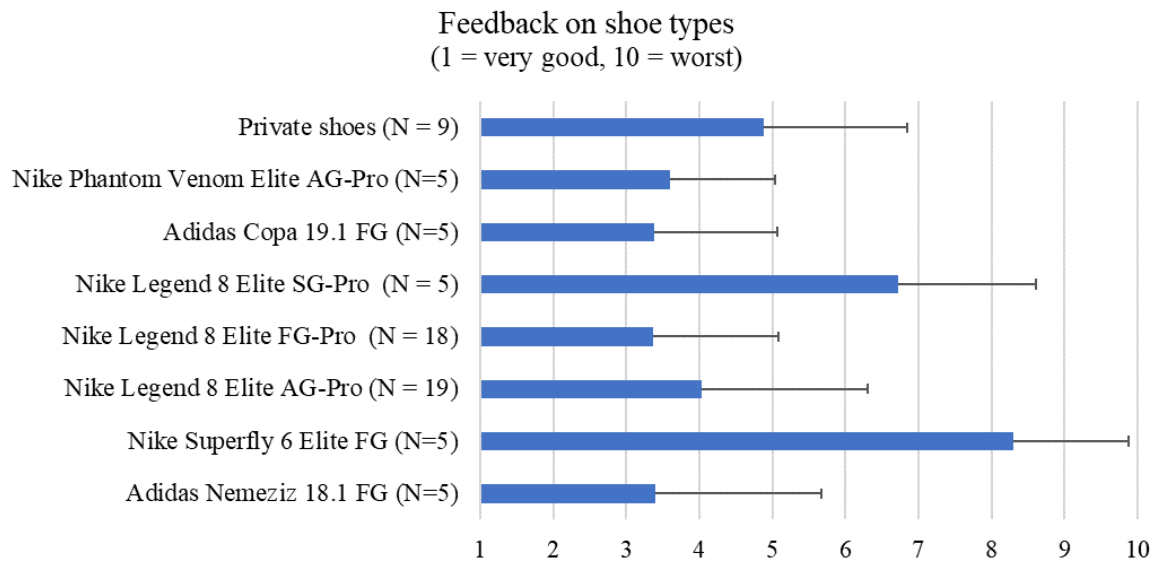


Figure 4. Feedback from 19 Norwegian soccer players on 8 shoe types. The shoes were used on 3 different turf systems. 17 male and 2 female soccer players from 6 different Norwegian soccer clubs scored each shoe type using a scale from 1-10 (1 = “very good” and 10 = “worst”). “N” is the number of players that visited the turf system. All values are presented as average \pm standard deviation.