

# Effect of floor type on the performance and welfare of finishing beef steers

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## 1. Application

Addition of rubber matting to indoor concrete slatted floors pens will improve finishing cattle performance and comfort.

## 2. Introduction

- In Ireland, seasonality of grass growth and inclement grazing conditions dictates an indoor winter period of 4-5 months/year.
- Beef cattle housing consists of 86% concrete slatted floors (CS). Within farms using CS, 55% use CS alone, 13% CS covered with rubber matting (RM), 15% CS combined with a straw-bedded area, and 3% CS combined with cubicles (Lawrence et al., 2016).
- Keane et al. (2018) reported no differences between housing cattle on CS versus RM in their meta-analysis study.
- However, the variation in experimental unit and products (mat type) used among studies may have impeded detection of effects.
- Within the meta-analysis improvements in ADG (Keane et al., 2015; Earley et al., 2017) and FCR (Keane et al., 2015) and tendencies for heavier carcasses (Keane et al., 2015; Earley et al., 2017) in finishing beef cattle accommodated on a specific RM product (Durapak) compared to CS, were observed.
- The **study objective** was to investigate the effect of **RM** (Durapak mat) compared to **CS** on intake, growth, feed efficiency, behaviour, hoof wear, cleanliness and carcass traits of finishing beef steers.



## Acknowledgements

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## 3. Material & Methods

- 140 Charolais and Limousin cross breed beef steers (1316 lb, SD 26.2; 571 days (d) old, SD 20.7).
- Steers offered grass silage-based total mixed ration (TMR) *ad libitum*
- Steers were blocked by weight, breed and age and from within block randomly assigned to one of **2 treatments** for 120 days (d); **i) CS** (n = 17) and **ii) RM** (n = 18) (Durapak Agri Ltd., Ballincollig, Co. Cork, Ireland) overlaid on CS.
- Penned in groups of 4 at a space allowance of 32 ft<sup>2</sup> per animal. Pen was the experimental unit.
- Feed was weighed into each pen daily and refusals were recorded twice weekly.
- Animals were weighed at 14 d intervals; average daily live weight gain (ADG) was determined by linear regression.
- Performance measures** - DM intake, average daily gain, feed conversion ratio (FCR), carcass weight, kill out proportion, conformation score, fat score (at slaughter).
- Welfare measures** - Dirt scoring (at 28d intervals), hoof wear and lesions (toe length and toe angle prior to the study and at slaughter and observed for lesions), blood sampling (haematological and metabolic variables at 28 d intervals) and behaviour (Two time points selected for 24 h observation (day (d) 6 and d 105) 9 pens from each treatment)
- Statistical Analysis**
- Data were analysed using a randomised mixed model ANOVA with the MIXED procedure of SAS (9.4). The model included the fixed effect for floor type and block was included as a random effect.

### References

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## 4. Results

**Table 1.** Effect of floor type on feed dry matter (DM) intake and performance of finishing steers

	Floor Type		SEM	P-value
	CS	RM		
Total DM intake (lb/day)	26.7	27.1	0.15	NS
Final live weight (lb)	1580.7	1320.4	3.45	***
FCR (lb DM/ lb ADG)	12.4	10.6	0.28	***
Live weight gain (lb/day)	2.3	2.5	0.03	***
Carcass weight (lb)	899	913	2.48	***

Concrete slats (**CS**); Rubber mat overlaid on concrete slats (**RM**); Not significant (NS) \* P < 0.05, \*\* P < 0.01, \*\*\* P < 0.001

### Behaviour

At d 6 and d 105 on **RM**:

- Lying duration was longer (P < 0.01)
- Number of lying and standing bouts was greater (P < 0.001)
- Number of getting up and lying down movements was greater (P < 0.001)
- There was a moderate correlation between FCR and standing bouts at d 6 (r = 0.67) and strong correlation between these variables at d 105 (r = 0.71) on **RM** only.

### Hoof wear

- No difference (P > 0.05) in toe length or toe net growth between treatments.
- Steers housed on **RM** had a sharper toe angle in the right front medial claw (P < 0.05) and left hind lateral claw (P < 0.001).
- There was no incidences of hoof lesions or lameness.

### Dirt scores

- There was a floor × time interaction for dirt scores (P < 0.05) whereby no differences between treatments existed from d 0 to 56 (P > 0.05) but from d 56 until slaughter steers housed on **RM** were dirtier than those on **CS** (P < 0.05).

### Haematology and metabolites

- There was no effect of floor type on any of the haematological or metabolic (P > 0.05) variables.

## 5. Conclusion

Finishing steer growth performance and feed efficiency is significantly improved as a result of housing on **RM**. The production benefits are complemented by enhanced animal behaviour traits indicative of greater resting and underfoot comfort of steers accommodated on the RM floor type and the absence of any negative impacts on hoof wear, lameness, or physiological responses