Analysis of sow lying behavior, crushing losses and piglets' nest acceptance in free farrowing systems during early lactation

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Background

- Free farrowing systems provide the opportunities of:

  - relatively free movements and increased activity of the sow,
  - more intensive sow – piglet interactions

→ **Objective:**

Systematic, detailed observation of the sows` behavior (lying down events), the crushing losses and the piglets` nest acceptance in 3 different free farrowing systems until 72 h post partum

- Period with the highest risk for crushing losses: first 72 hours post partum

  - better understanding of the needs, preferences and behavior of sows enables further adaptations and system modifications

Material and Methods

- Research farm Wehnen, Chamber of Agriculture in Lower Saxony, Germany
- December 2016 – October 2018; in 8 batches
- n = 36 sows (1. – 6. parity)
- 3 free farrowing systems (housing-in one week before farrowing)
- Aimed barn temperature: 21°C
- Lightening scheme: 8 a.m. – 5:30 p.m.

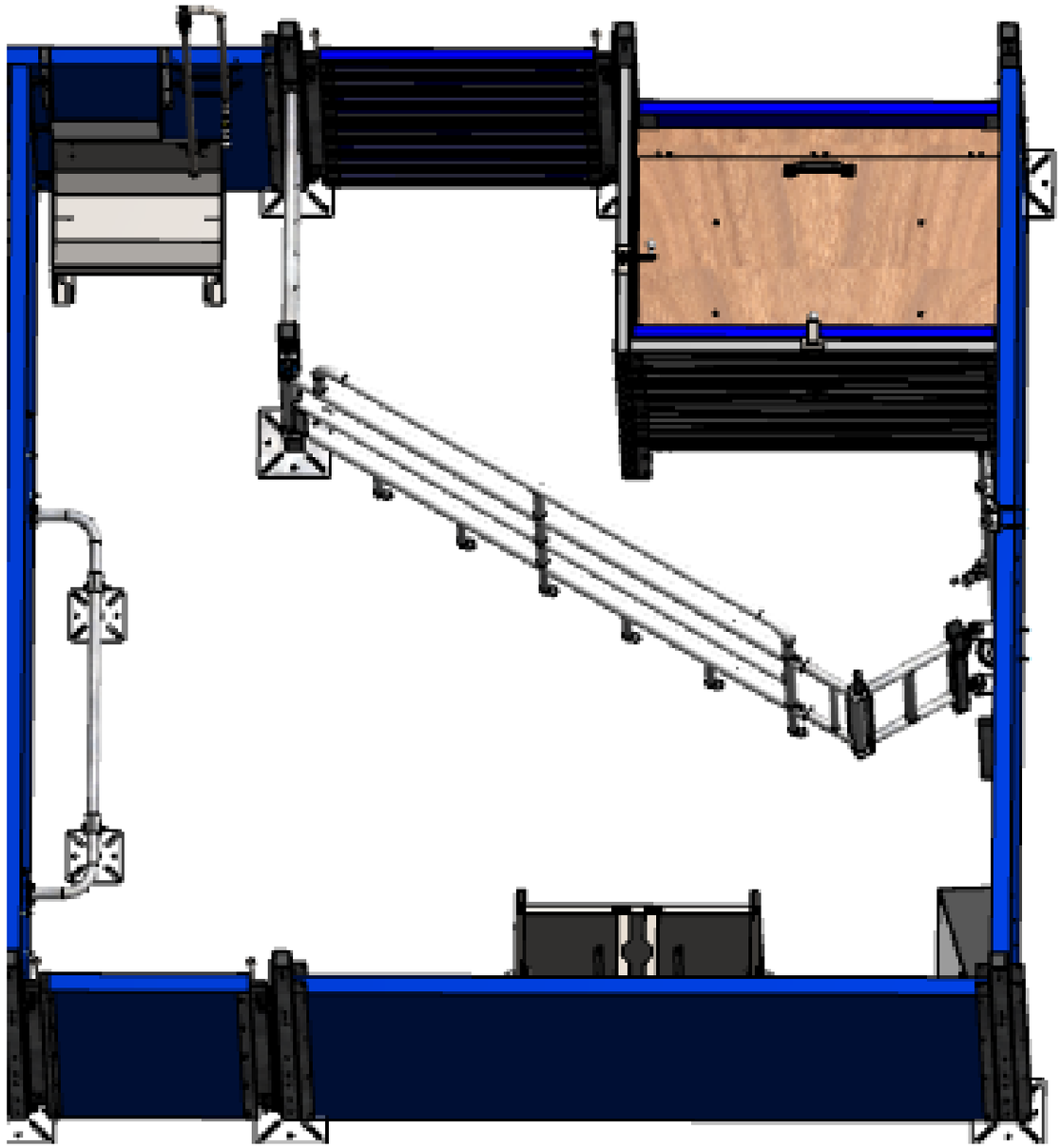
Farrowing pens – No. 1 „Box“

Total: **7.3 m²**

Sow: **3.7 m²**

Piglet nest: **1 m²**

(Chamber of Agriculture)



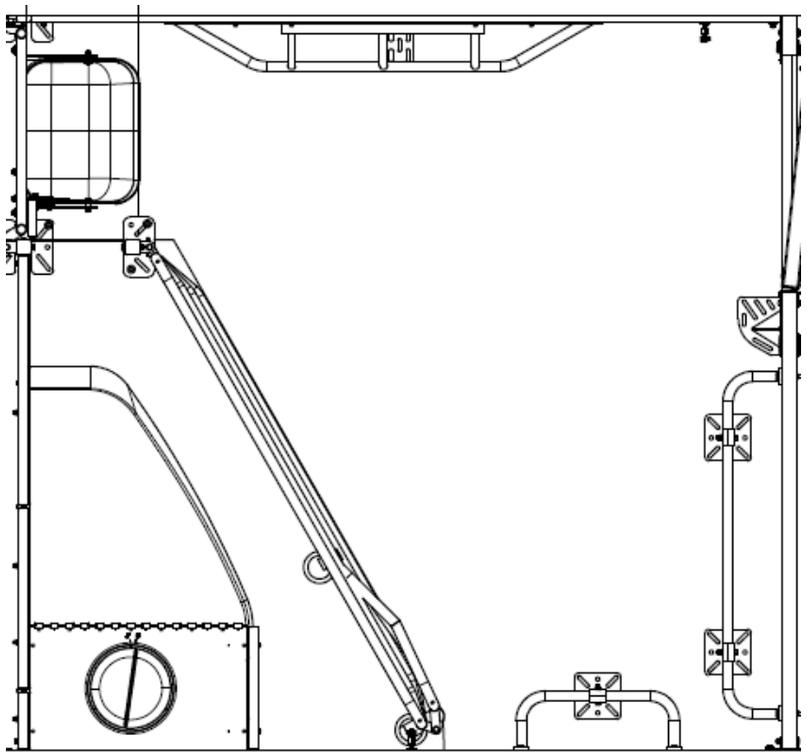
(Big Dutchman)

Farrowing pens – No. 2 „Open 1“ and 3 „Open 2“

Total: **5.9 m²**

Sow: **3.9 m²**

Piglet nest: **1 m²**



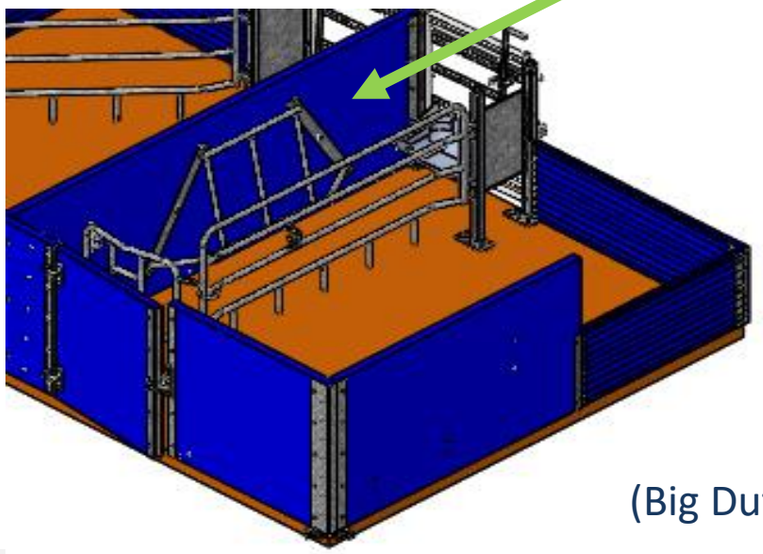
(Big Dutchman)

Total: **6 m²**

Sow: **4 m²**

Piglet nest: **1 m²**

(Chamber of Agriculture)



(Big Dutchman)

Data recording

- Animal individual, continuous video records until 72 h post partum (Start: birth of first piglet)

Assessment of: (observed by one and the same person)

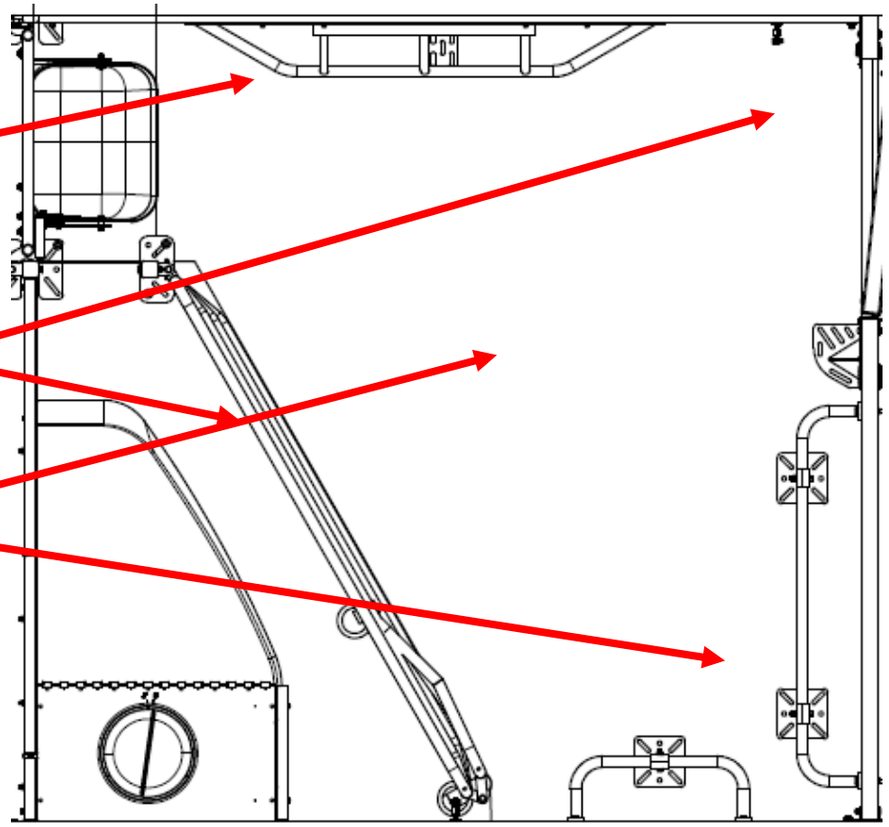
1. **Sows‘ lying down events:**

- Completely controlled (CON)
- Forehand controlled, belly position (BELLY)
- Forehand controlled, side position (SIDE)
- Uncontrolled (UNCON)

Data recording

2. Location of lying down events:

- Fixation grate
- (Sloped grate)
- Protection rail
- Partly pen contact
- Without any contact



(Big Dutchman)

3. Crushing losses, reasons: lying down event vs. altered lying position

4. Piglets‘ nest acceptance: the first piglet in the nest; 80% of piglets in the nest

Data analysis

Time categories

- Hours after birth of first piglet:

1. Phase 1: up to 10 h
2. Phase 2: 10 – 30 h
3. Phase 3: 30 – 50 h
4. Phase 4: 50 – 72 h

Results

Descriptive overview

Parameter	BOX	OPEN1	OPEN2
Number of sows	8	14	14
Ø piglets born alive (SD)	12.7 (5.6)	15.2 (2.9)	17 (3.5)
Ø number of parity (SD)	3.1 (2.0)	4.2 (1.5)	2.8 (1.6)

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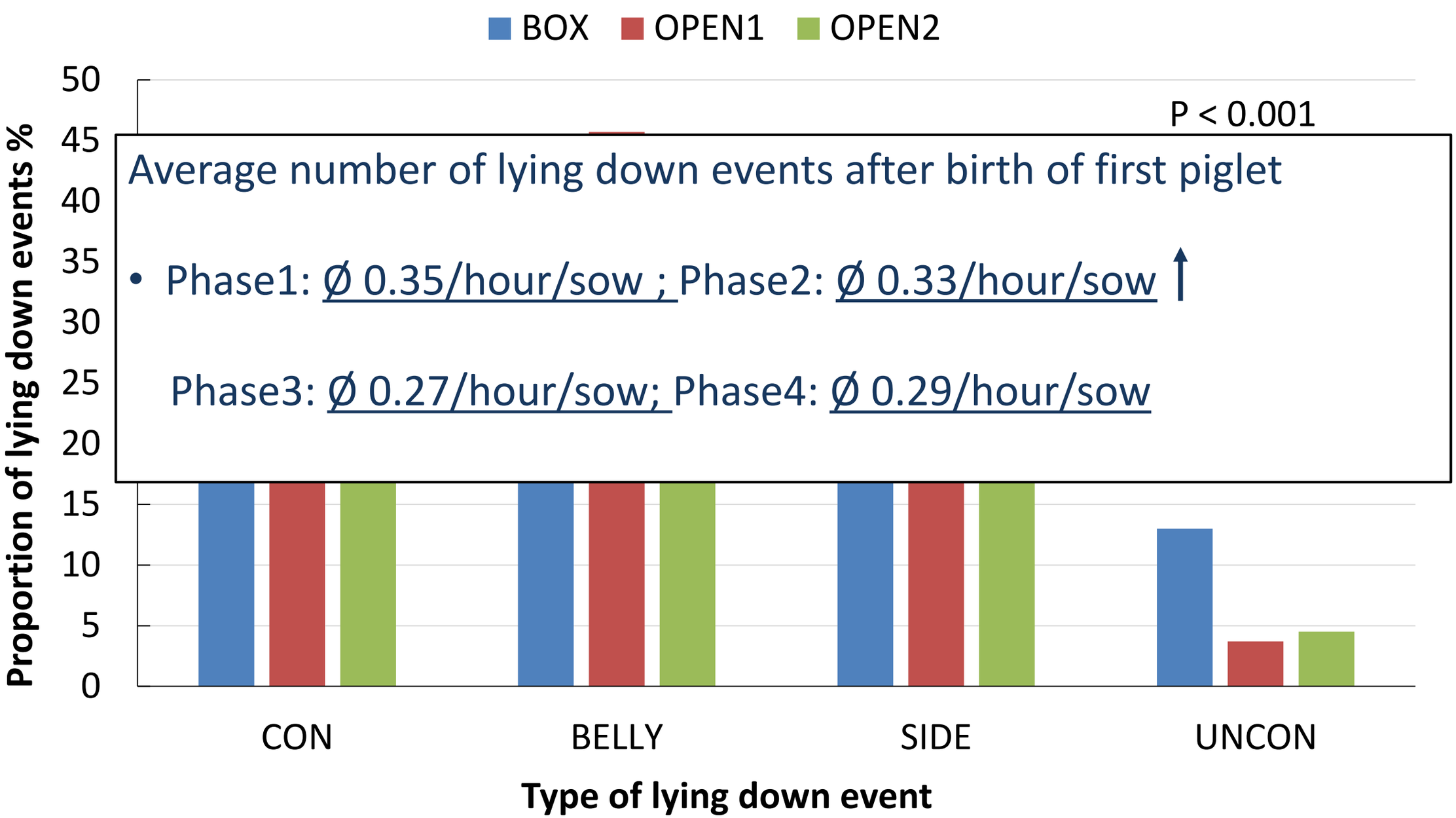
Ø number of parity (SD)	3.1 (2.0)	4.2 (1.5)	2.8 (1.6)
Number of lying down events			
Ø per sow (SD)	21 (6.4)	23.3 (5.9)	20.6 (7.7)

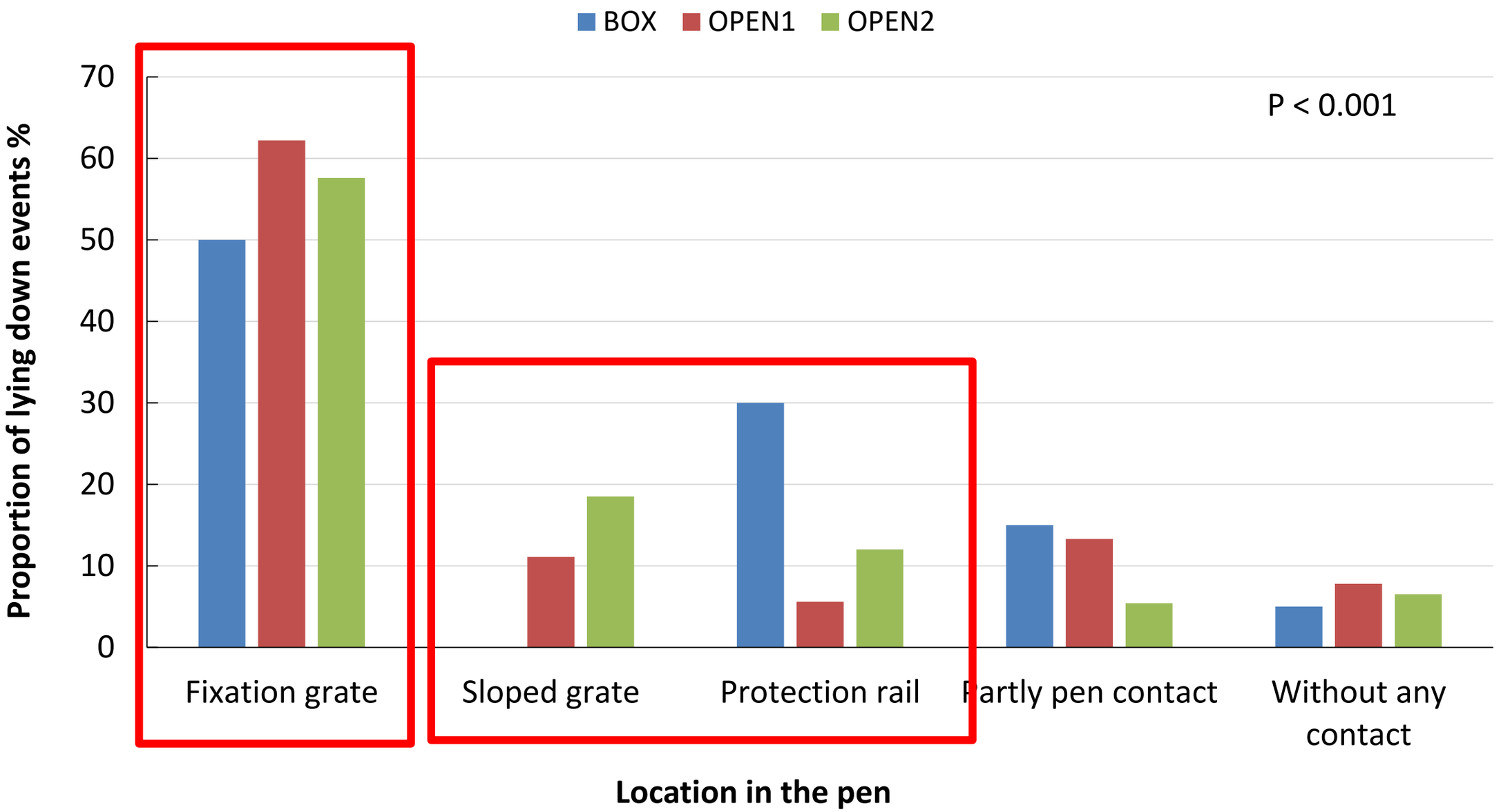
Sows' lying down events

Type of lying down per pen



Sows’ lying down events

Location of lying down within the pen



Crushing losses (n = 92)

Hours after birth of the first piglet	Ø crushing losses/hour/sow (until 72 h p.p.)
Phase 1 (up to hour 10)	0.03
Phase 2 (hours 10-30)	0.54
Phase 3 (hours 30-50)	0.04
Phase 4 (hours 50-72)	0.03

Reason for the crushing losses

Lying down event	Alteration in lying position
34%	66%

Reason for the crushing losses

Lying down event		Alteration in lying position	
34%		**66%**	
SIDE	48%	Rolling	
UNCON	35%	BELLY-SIDE	71%
BELLY	16%	SIDE-BELLY	20%
		Others	9%

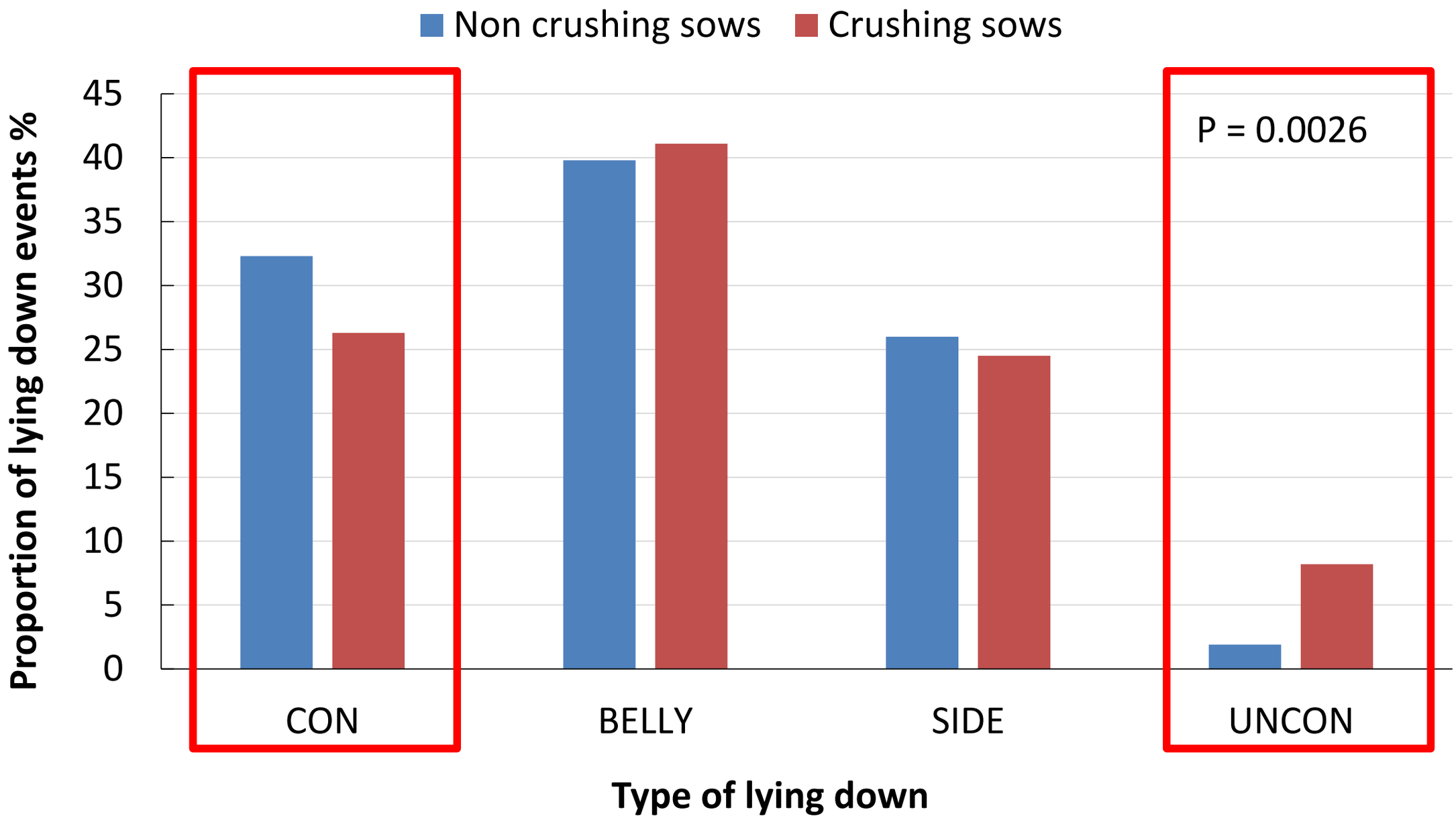
Crushing losses (n = 92)

Parameter	BOX	OPEN1	OPEN2
Ø piglets born alive (SD)	12.7 (5.6)	15.2 (2.9)	17 (3.5)
Crushing losses			
Sum/pen type (Ø per sow)	13 (1.6)	37 (2.6)	42 (3)
% of total crushing losses	14	40	46

→ In total: 12 `Non – crushing sows`

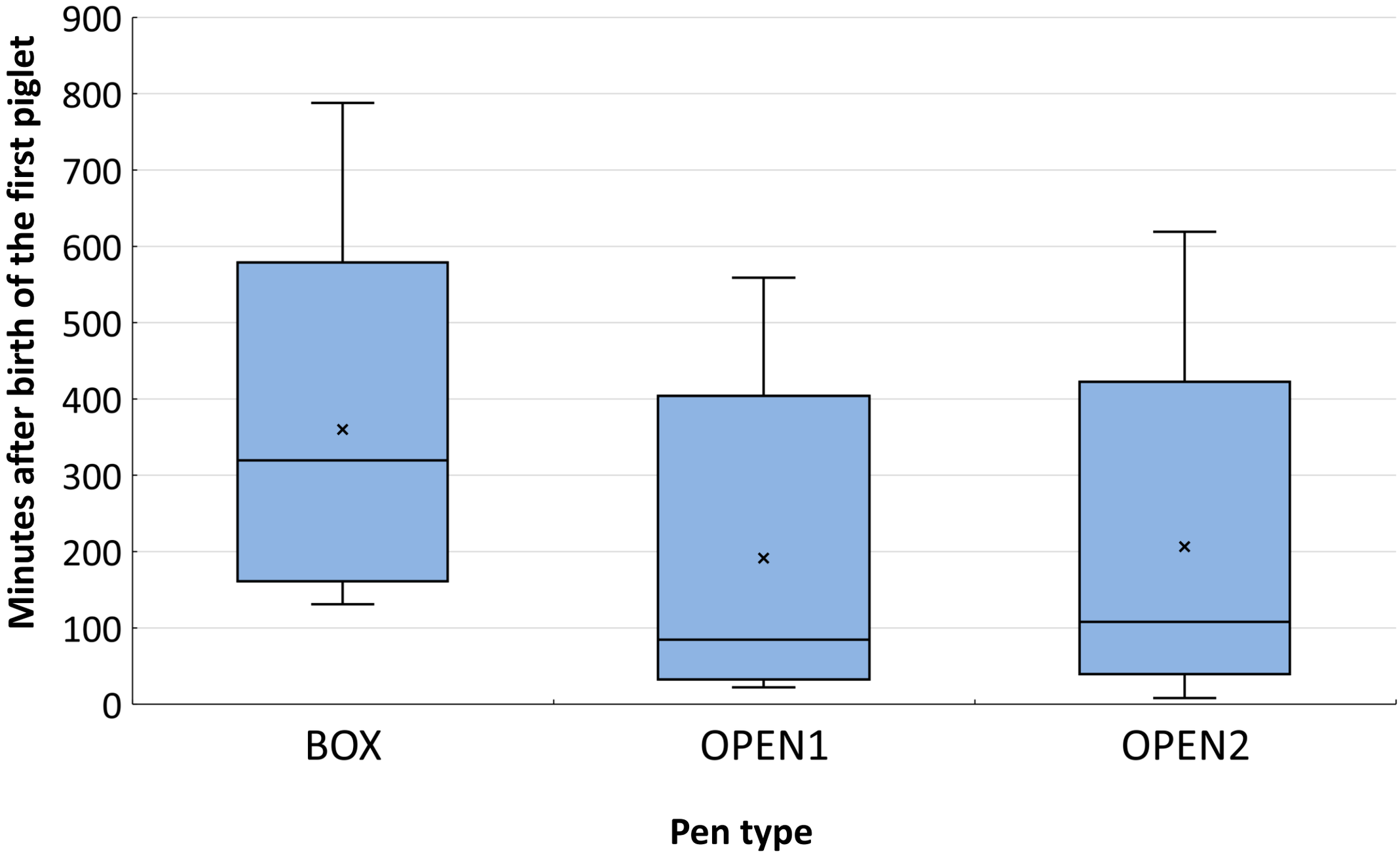
Sows with vs. without crushing losses

Type of lying down



Piglets‘ nest acceptance

Time (min) until the first nest visit



Conclusion

- Pen design significantly influenced the sows` lying down behavior

  → Preferred next to the piglets, using enrichment for controlled lying down (fixation grate)

- Most of the crushing losses → lying position change

- Crushing losses were related to litter sizes

Conclusion

- Free farrowing offers advantages for sow and piglets

  → free movement, sow-piglet relation

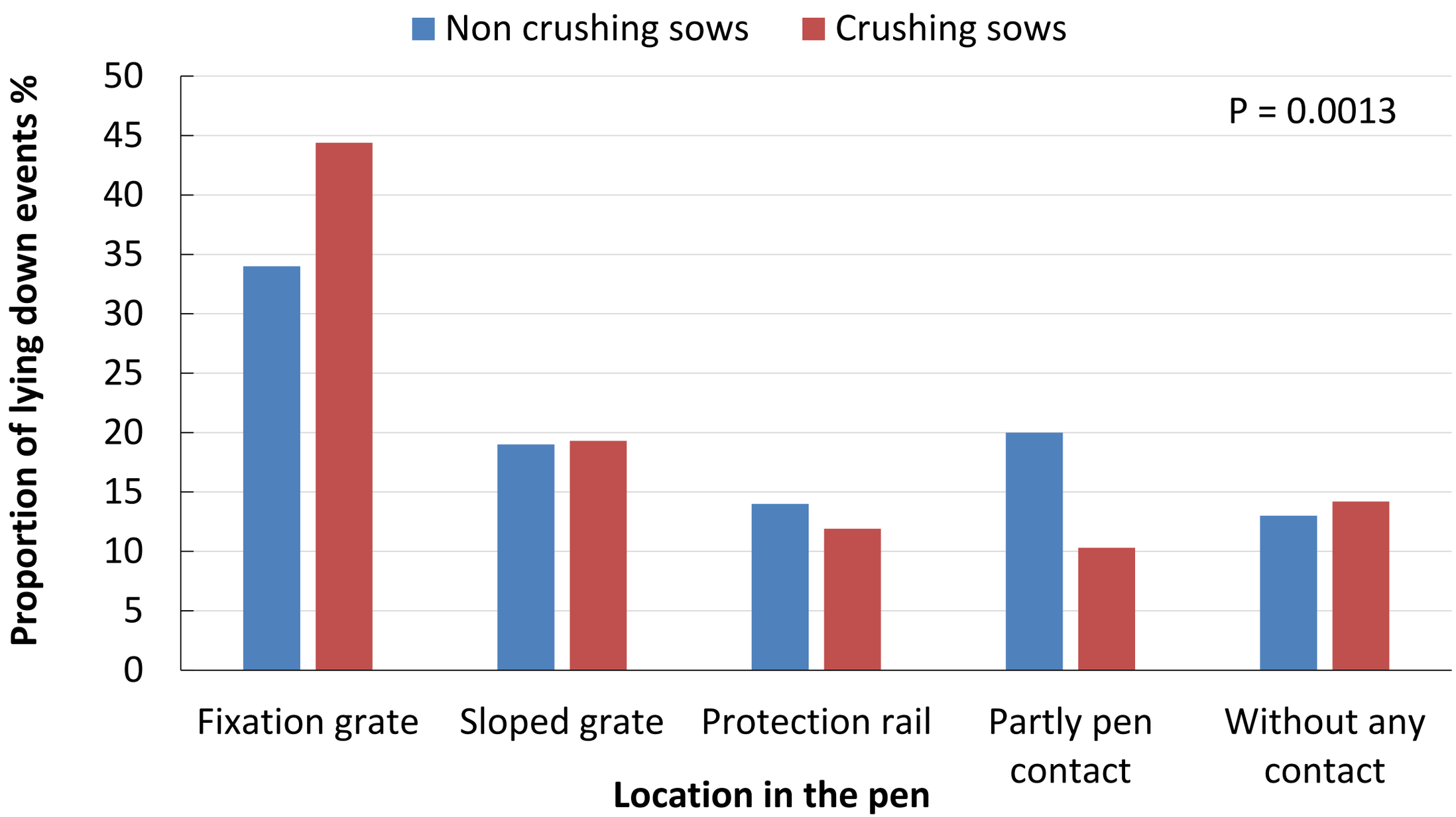
- Crushing losses are a crucial factor in the assessment of farrowing systems

  → sows‘ behavior should be taken into account in order to meet their needs

Thanks a lot for your attention!

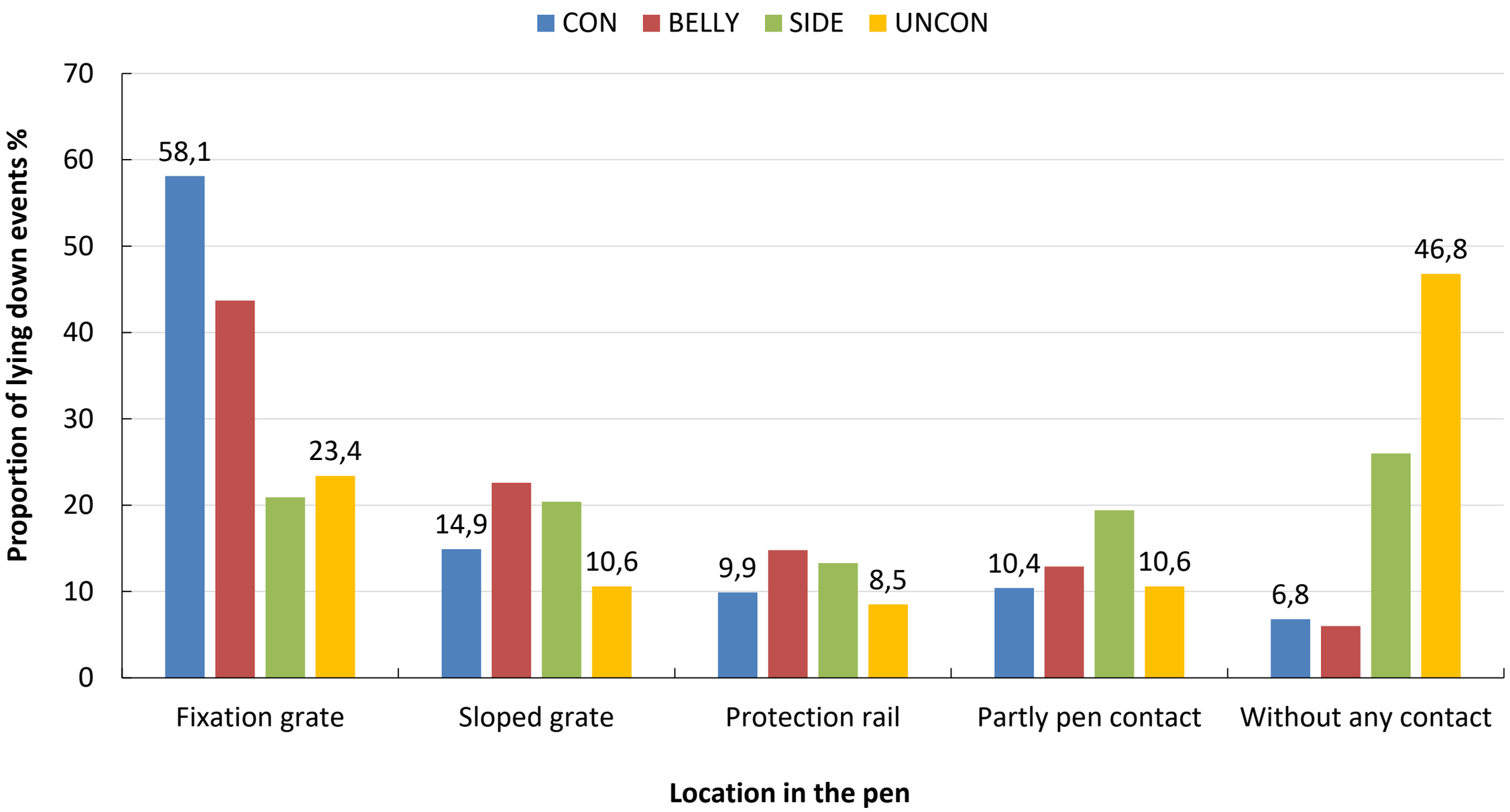
Sows with vs. without crushing losses

Location of lying down



Sows’ lying down events

Location and type of lying down within the pen



Piglets‘ nest acceptance

Time (h) until 80% of the piglets were in the nest