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Dřevozpracující družstvo
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Dresden, 24 January 2025
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Test Report
Order no. 2624249

Client: Dřevozpracující družstvo
Lukavec čp. 9
394 26 Lukavec, Czech Republic

Order: Determination of performance characteristics for load-bearing panels for use as floor-decking on beams acc. to EN 12871:2013

Contractor: Entwicklungs- und Prüflabor Holztechnologie GmbH
Laboratory Unit Material and Product Testing
Zellescher Weg 24
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Engineer in charge: Dipl.-Ing. Jens Gecks

i.V.

Dipl.-Ing. Jens Gecks
Head of Laboratory Unit Material and Product Testing (PT)

The test report contains 9 pages and an annex with 1 page. Any duplication of extracts requires the written permission of EPH. The test results refer exclusively to the material tested.
All numerical values within this document are given with a comma as decimal.

1 Task

The accredited Entwicklungs- und Prueflabor Holztechnologie GmbH (EPH) was ordered by DDL Dřevozpracující družstvo Company to carry out the tests regarding static point-load and soft body impact according to EN 12871:2013 and EN 1195:1997 on a load-bearing flooring.

2 Sample material

The test material was sent to the Contractor by the Client and got to the laboratory on 2 December 2024. The flooring consists of the following components (see drawing provided by the Client at the Annex):

Support beams (crossbeam):

Cross-section: 60 mm x 79 mm (deviation from the data at the drawing),
Length: 2400 mm
Material: softwood (spruce), C24
Centre distance: 600 mm
Installation: supported on the test device

Acoustic tape (self-adhesive):

Cross-section: 65 mm x 3 mm,
Material: foam
Installation: continuously applied on the topside od each support beam, see Fig. 1

JSD particleboard with milled channels for tubes for floor-heating systems and profiled long-side edges:

Overall thickness: 28 mm,
Length and width: 1300 mm x 614,5 mm
Surface width: 600 mm
Installation: on the support beams (long side of the boards perpendicular to the axis of the beams, fixation with self-drilling screws at a size of 5x60 mm (Domax, DoP-310506-2019), without pre-drilling, for distance between the screws and edge distance see Annex, see Fig. 1 and 2

Cetris Basic cement-bonded particleboard:

Thickness: 8 mm,
Length and width: 2400 mm x 650 mm
Installation: on the particleboard (long side of the cement-bonded boards parallel to the axis of the beams, fixation on the JSD boards with self-drilling screws at a size of 4x30 mm (Domax, DoP-310403-2019), cement-bonded boards pre-drilled, for distance between the screws and edge distance see Annex, see Fig. 3

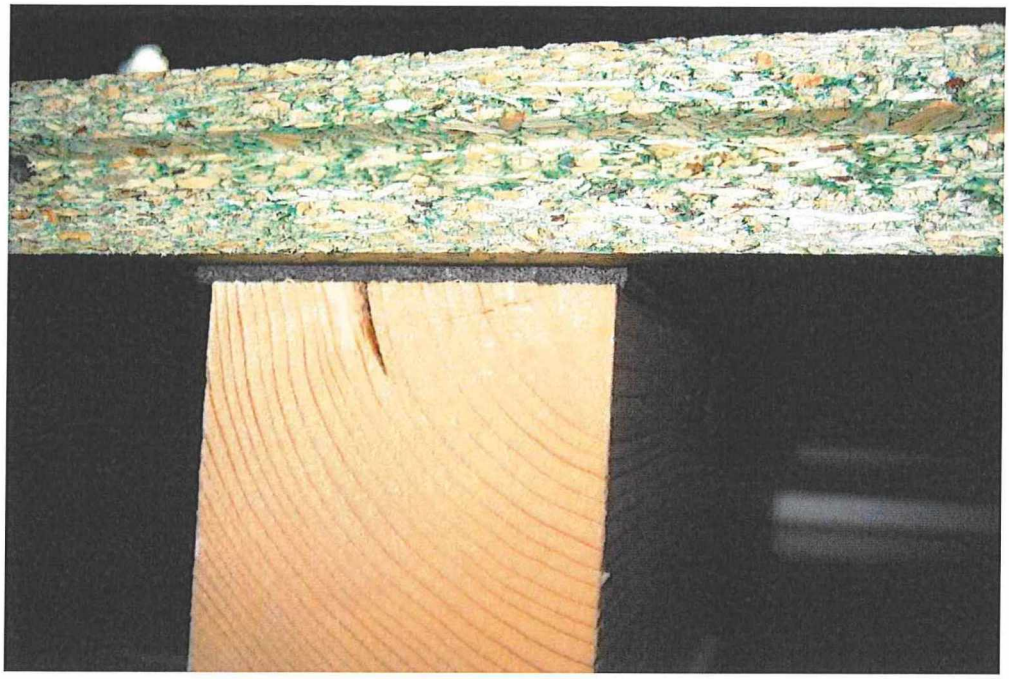

Fig. 1:
Support beam, acoustic tape and JSD particleboard

Fig. 2:
Top view on the JSD particleboard

3 Test performance

The tests were carried out using the following standards:

EN 1058:2009: Wood-based panels – Determination of characteristic 5-percentile values and characteristic mean values;

EN 1195:1997: Timber structures – Test methods – Performance of structural floor decking;

EN 12871:2013: Wood-based panels – Determination of performance characteristics for load bearing panels for use in floors, roofs and walls;

The test was performed between 4 December 2024 and 10 January 2025.

The tests were carried out using the TIRAtest 2830S universal test device. 12 assemblies were tested. The load was applied according to EN 12871 at mid-span, near the long-side connection of JSD particleboard: in case of tests No. 1, 5, 8, 10, 13 and 15 at the groove side, in case of tests No. 2, 4, 6, 9, 12 and 14 at the tongue side (see Fig. 3). The contact area was 50 mm x 50 mm; that means that k_{dis} = 1,0. The measurement of the deflection was carried out inside the test device.

The impact body described at EN 1195 (leather bag) was used for the soft body impact test on tests No. 3, 11 and 17 (on the tongue side) and No. 7 and 16 (on the groove side). The following drop heights were applied step by step: 150 mm, 300 mm, 450 mm, 600 mm, 750 mm and 900 mm, see Fig. 4. The impact points were situated at mid-span of JSD particleboard. The damages on the boards were assessed visually.

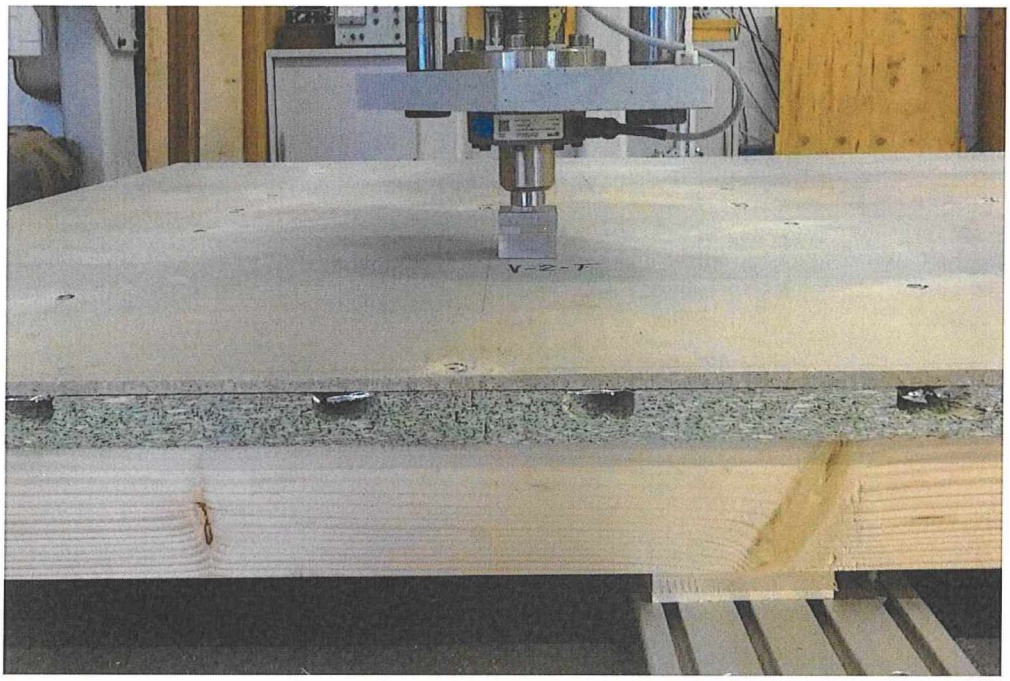

Fig. 3:
Test assembly for static test and loading point on the tongue side.

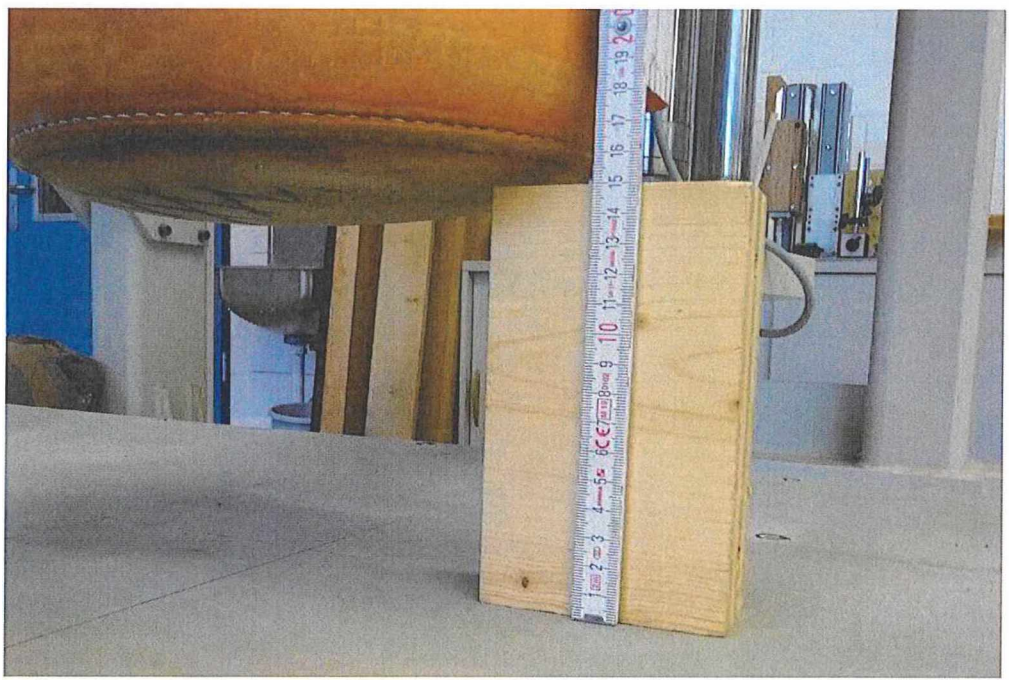

Fig. 4:
Impact test (leather bag) at the initial height of 150 mm

4 Results

4.1 Static point load test

Serviceability limit state (SLS): R_{mean}

The $F_{max,est}$, F_{21} and F_{24} values were determined at preliminary tests and were assumed as:

$F_{max,est}$ = 7300 N F_{21} = 730 N F_{24} = 2920 N

The test results are summarized at Table 1.

Table 1: Stiffness of the test assemblies (R)

No. of test	Stiffness in N/mm at a span of 600 mm
1-G	607
2-T	626
4-T	553
5-G	567
6-T	582
8-G	579
9-T	600
10-G	597
12-T	603
13-G	576
14-T	624
15-G	567
Mean value:	590
Standard deviation:*	23
R_{mean}:*	**576**

Note: * Calculation acc. to EN 1058, Annex B, with n = 12 and k_s = 2,056

Ultimate limit state (ULS): $F_{max,k}$

The test results are summarized at Table 2.

Table 2: Maximum load of the test assemblies (F_{max})

No. of test assembly	Max. load in N at a span of 600 mm
1-G	6891
2-T	7567
4-T	7112
5-G	6893
6-T	6727
8-G	6948
9-T	6725
10-G	6804
12-T	6933
13-G	6572
14-T	6962
15-G	6731
Mean value:	6905
Stand. deviation (log):*	0,036
$F_{max,k}$:*	**6412**

Note: * Calculation acc. to EN 1058, Annex A, with n = 12 and k_s = 2,056

Failure:

The failure occured by local punching failure, see Fig. 5 and Fig. 6.

Fig. 5:
Local punching failure (top view).

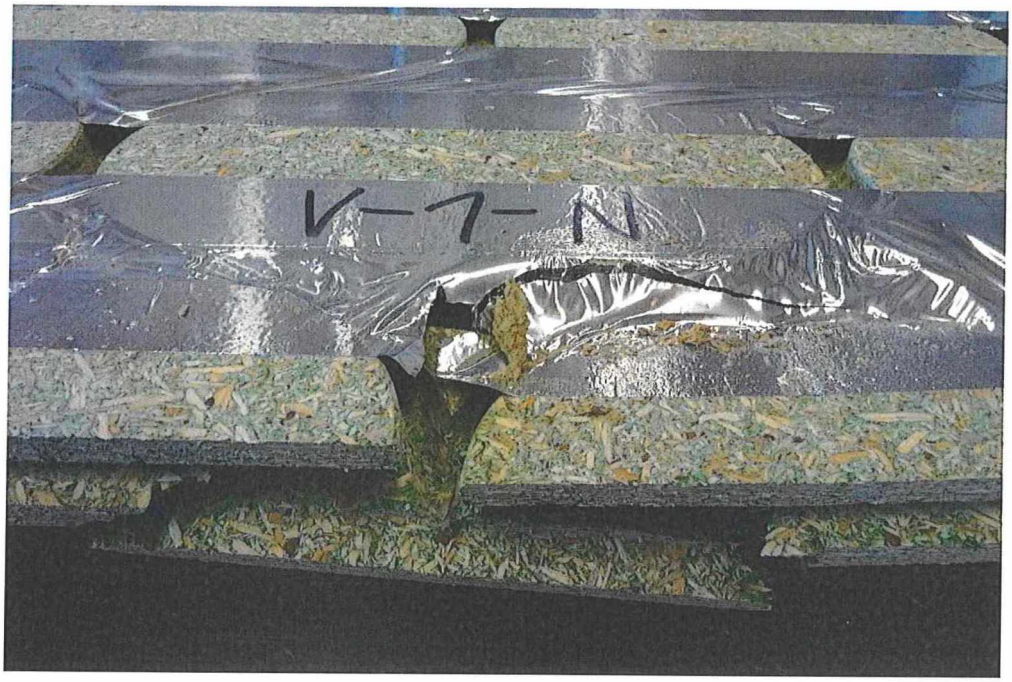

Fig. 6:
Local punching failure (view after removing of cement-bonded board).

Serviceability limit state (SLS): F_{ser}

The characteristic value of the SLS load was calculated as 70 % of the maximum load.

F_{ser} = **4488 N** (Span: 600 mm)

Serviceability limit state (SLS): Deflection w_m at $0{,}4F_{max,est}$

The deflection w_m at 40 % of the maximum force (calculated based on EN 1195, cause 6.5.1 a) is shown at Table 3.

Table 3: Deflection (w_m)

No. of test assembly	w_m in mm, at a span of 600 mm
1-G	5,13
2-T	4,96
4-T	5,57
5-G	5,39
6-T	5,40
8-G	5,33
9-T	5,29
10-G	5,10
12-T	5,16
13-G	5,27
14-T	4,95
15-G	5,34
Mean value:	**5,24**
Standard deviation:	0,19

4.2 Soft body impact

The results are summarized at Table 4.

Table 4: Soft body impact (span: 600 mm)

	Assessment in case of a drop height of					
No. of test assembly	150 mm	300 mm	450 mm	600 mm	750 mm	900 mm
3-T	- (0,2)	- (0,4)	-	-	-	-
7-G	- (0,3)	- (0,5)	-	-	-	R
11-T	- (0,3)	- (0,4)	-	-	-	R
16-G	- (0,2)	- (0,4)	-	-	-	R
17-T	- (0,2)	- (0,5)	-	-	-	R

Key:

- damages or cracks not visible
() residual deformation, value given in mm
R cracks are visible, the board is broken, but the impact body did not push through the board
F failure of test assembly (test body pushed through the board)
x test stopped after failure

For visible cracks, see Fig. 7.

The test assemblies can be classified to impact resistance class I acc. to EN 12871.

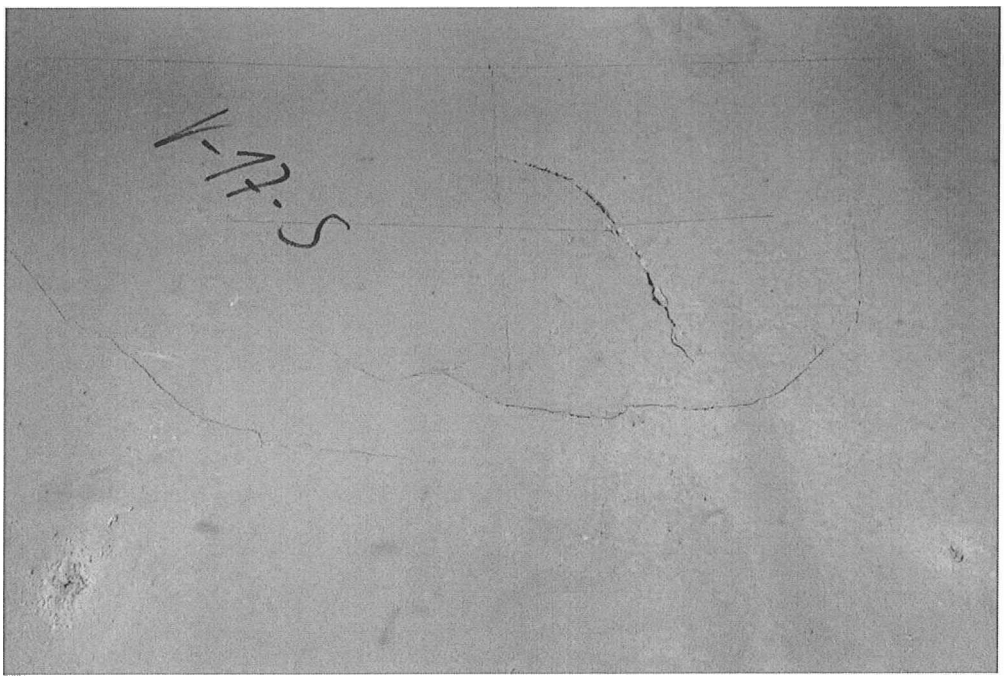

Fig. 7:
Cracks on the cement-bonded board after impact at a height of 900 mm

5 Summary

Table 6: Summary of test results

Parameter	Result, Span: 600 mm
$F_{max,k}$	6412 N
$F_{ser,k}$	4488 N
R_{mean}	576 N/mm
w_m	5,24 mm
Impact Class	I

Statements on conformity assessment/classification were made on the basis of the measurement results obtained. Measurement uncertainties are not included in the assessment (ILAC G8 03/2009 "Guidelines on the Reporting of Compliance with Specification" Section 2.7).

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