

Über der Nonnenwiese 1 • 99428 Weimar
Phone/Fax: +49 3643 8684-0/+49 3643 8684-113
E-Mail/URL: kontakt@iab-weimar.de/www.iab-weimar.de



Summarising Assessment of the Findings of the Study

Comparing Production Boards [1]

IAB 1912-1

Short title: Overview of Production Boards

Project: Study for the product comparison of production boards
a decision-making aid for companies

Customer: WASA Compound GmbH & Co. KG
Meininger Str. 9
98617 Neubrunn

Person in charge: Dipl.-Math. Bernd Jatho

Pages: 11

Weimar, 25.02.2019

[signature]

Dr.-Ing. Ulrich Palzer
Institute Director

[signature]

Dr.-Ing. Justus Lipowsky
Head of the research department
Process Technology

Table of Contents

1	Overview.....	3
2	Assessment	4
2.1	Physical Properties	5
2.2	Handling in the Production Process	6
2.3	Economical Aspects.....	7
2.4	Ecological Aspects.....	8
2.5	Overall Balance	9
	Table of Figures	11
	List of Tables.....	11
	Bibliography and Source References	11

1 Overview

Production boards are used as a support for the forms in the production of precast concrete blocks. Hence the following requirements apply, which must be fulfilled during the life of a production board:

- Geometric stability in all dimensions, in particular against sagging
- Good vibration transmission, in order to ensure good compaction
- Smooth surface without indentations, i.e. insensitive to mechanical effects, in order to obtain good quality blocks
- Little or no moisture absorption resp. sensitivity
- Simple to store, when not required in the production process
- Minimal maintenance work
- Chemical resilience
- Long service life with virtually unchanged properties
- Low price, relative to service life

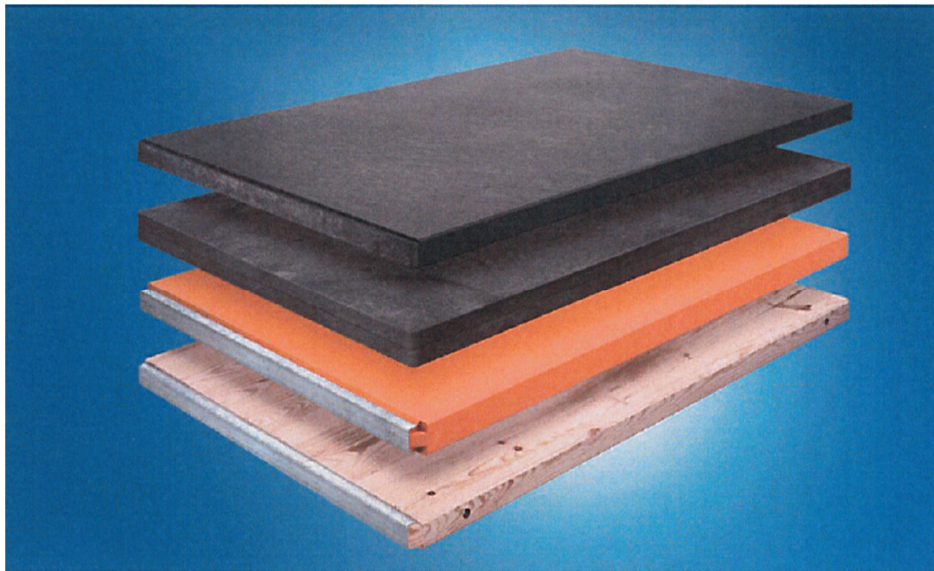


Figure 1: Common Board Types [1]

The following base materials are in use for production boards:

- Softwood
- Hardwood
- Plastic*
- Steel

And, the following material combinations, with which it is attempted to minimise the disadvantages of an individual material:

- Laminated woods
- Plastic-coated woods
- Steel-encased woods
- Fibre-reinforced plastic *
- Steel-reinforced plastic *

* the term plastic is to be understood as various styrene polymers,

2 Assessment

Below, production boards made from various materials are compared according to the aspects of their physical properties, the handling in the production process, the economical conditions and their ecological balance.

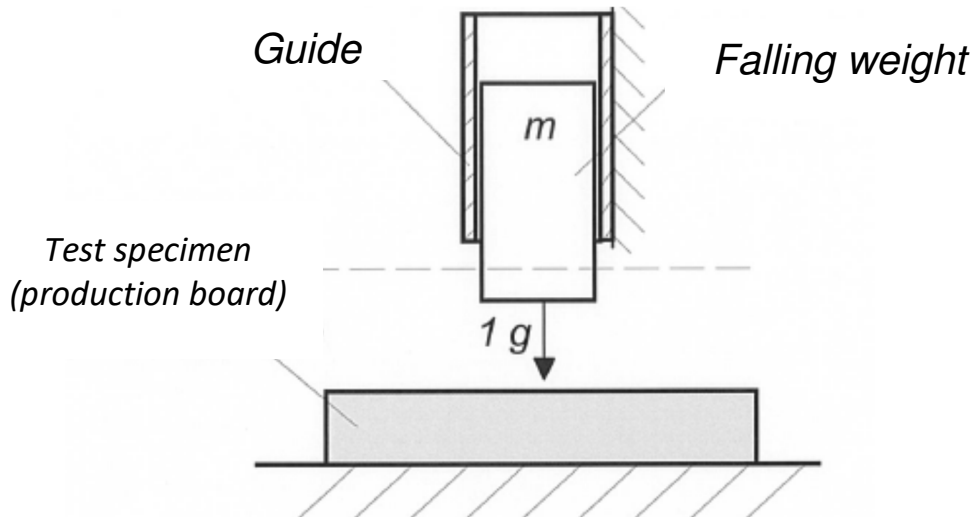


Figure 2: Diagram of the measurement of acceleration peaks as one of the investigated physical properties in the technology center of IAB Weimar gGmbH

In the following diagrams the subjective best product is indicated with the value 100. The other assessments are specified relative to it.

The specified weighting of the respective properties flows into these assessments.

2.1 Physical Properties

Table 1 shows the weighting of the physical properties taken as a basis for the assessment in Figure 3.

Table 1: Weighting of the physical properties

Property	Weighting in %
Vibration transmission	40
Geometric stability, sagging	20
Sensitivity to mechanical damage	20
Abrasion resistance in the production process	20

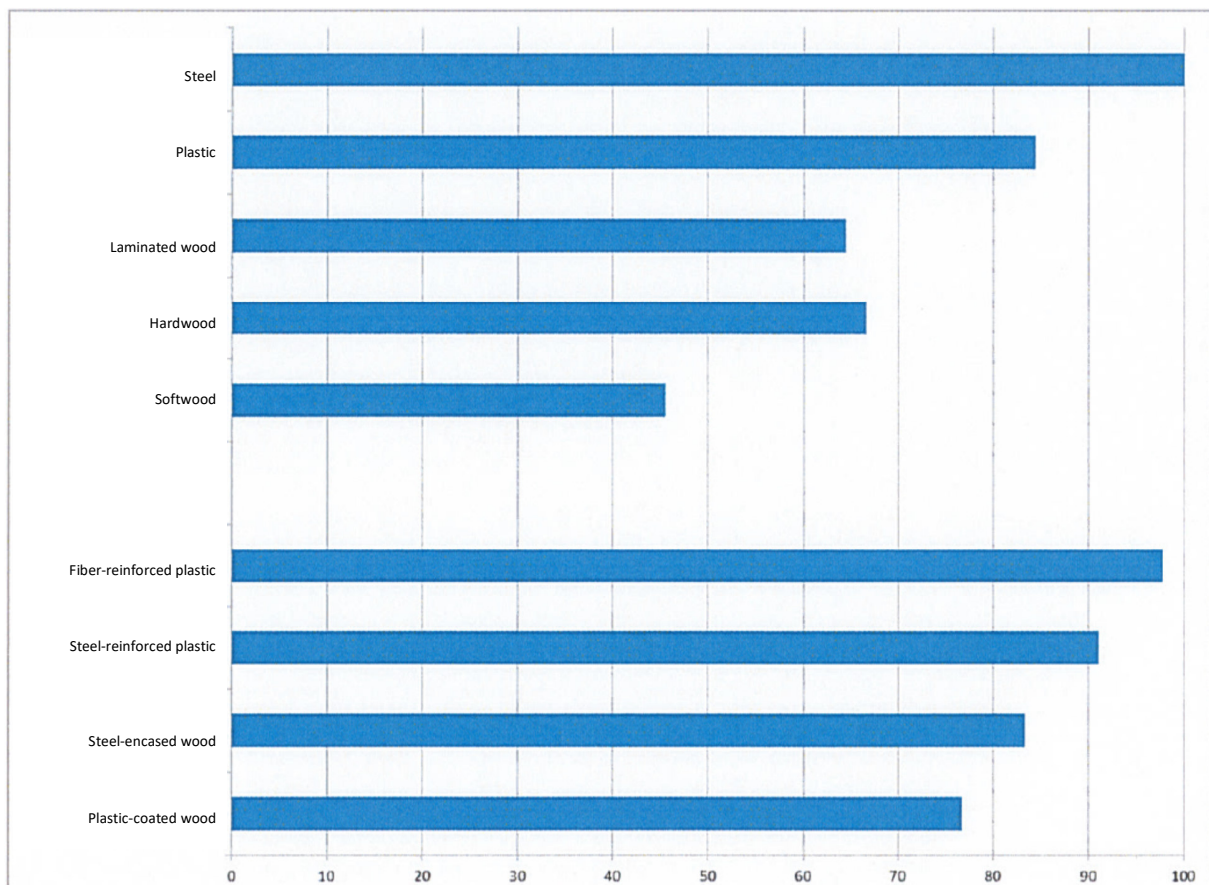


Figure 3: Board comparison according to physical properties

2.2 Handling in the Production Process

Table 2 shows the weighting of the handling in the production process taken as a basis for the assessment in Figure 4.

Table 2: Weighting of the handling in the production process

Property	Weighting in %
Weight	30
Storage	30
Maintenance requirement	30
Cleaning	10

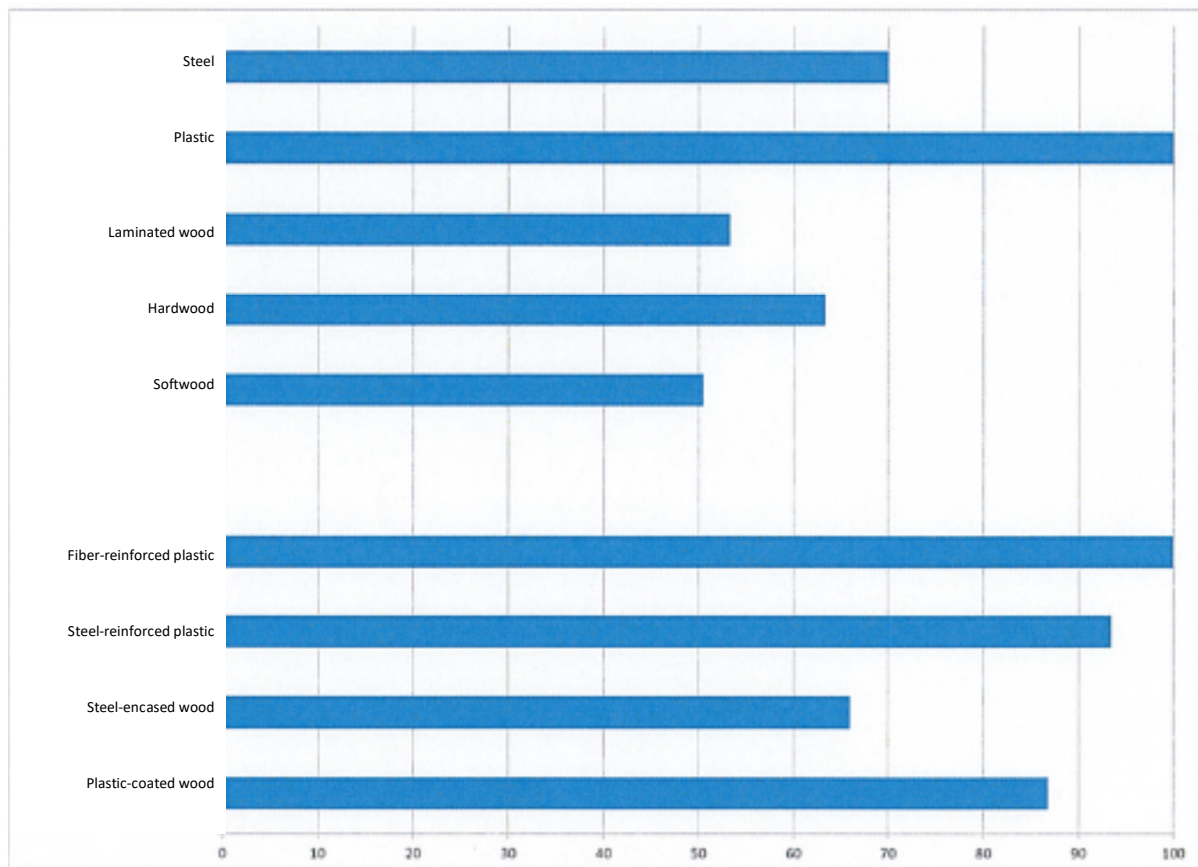


Figure 4: Board comparison according to handling in the production process

2.3 Economical Aspects

Table 3 shows the weighting of the economical aspects taken as a basis for the assessment in Figure 5.

Table 3: Weighting of the economical aspects

Property	Weighting in %
Price	40
Service life	40
Storage requirements	20

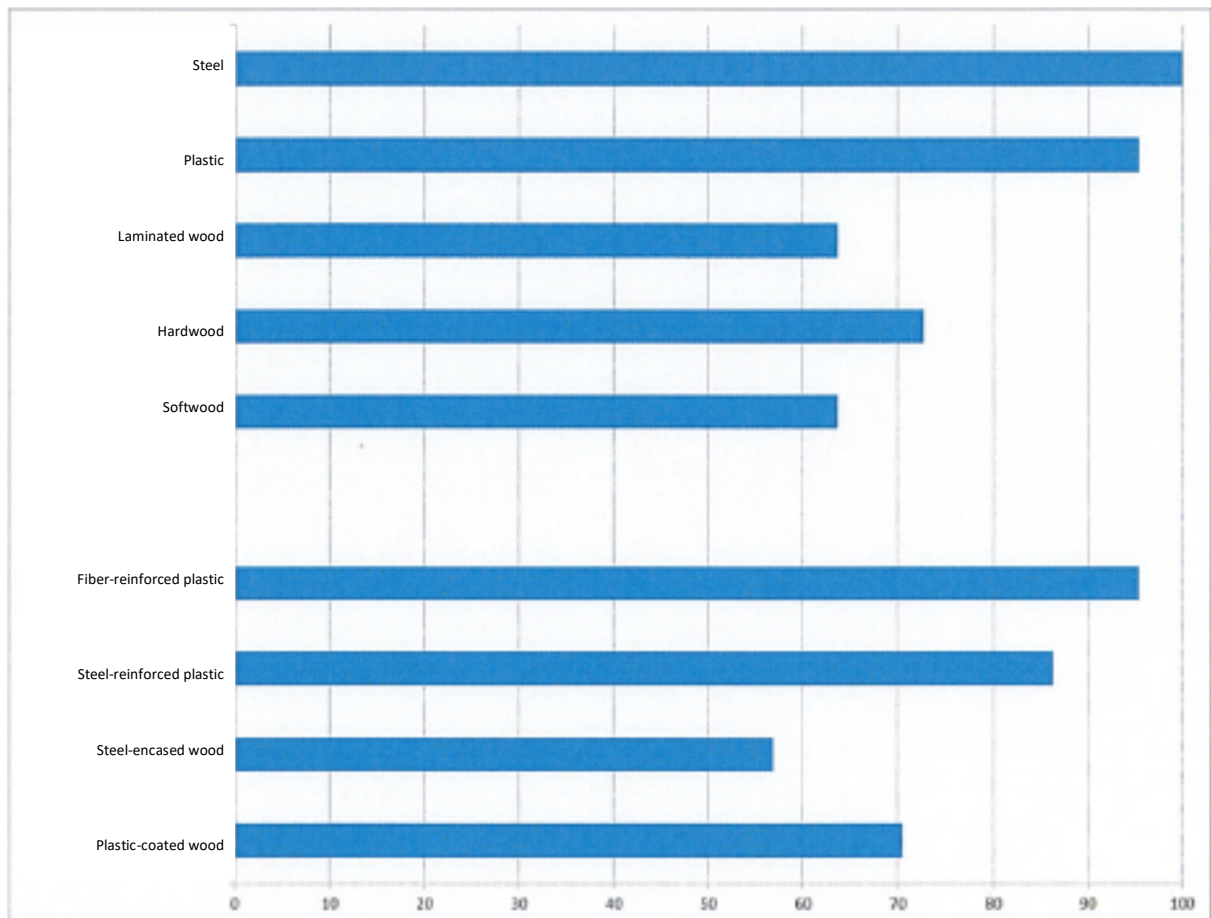


Figure 5: Board comparison according to economical aspects

2.4 Ecological Aspects

Table 4 shows the weighting of the ecological aspects taken as a basis for the assessment in Figure 6.

Table 4: Weighting of the ecological aspects

Property	Weighting in %
Materials used	40
Energy required for the manufacture	20
Reprocessing (grinding down)	20
Recycling	20

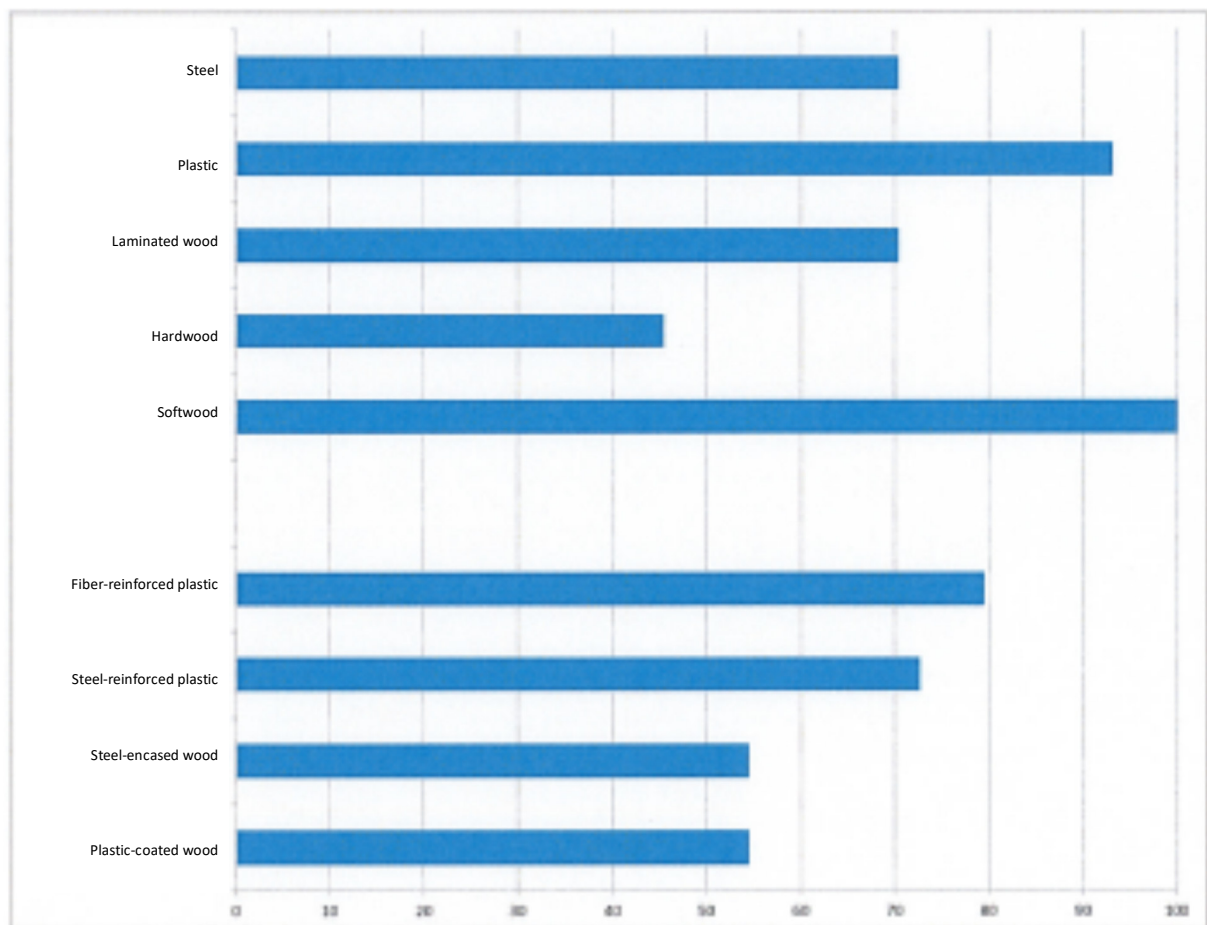


Figure 6: Board comparison according to ecological aspects

2.5 Overall Balance

Table 5 shows the weighting of the partial aspects summarised in the overall balance for the assessment in Figure 7.

Table 5: Weighting of the partial aspects in the overall balance

Partial aspect	Weighting in %
Physical properties	50
Handling in the production process	10
Economical aspects	20
Ecological aspects	20

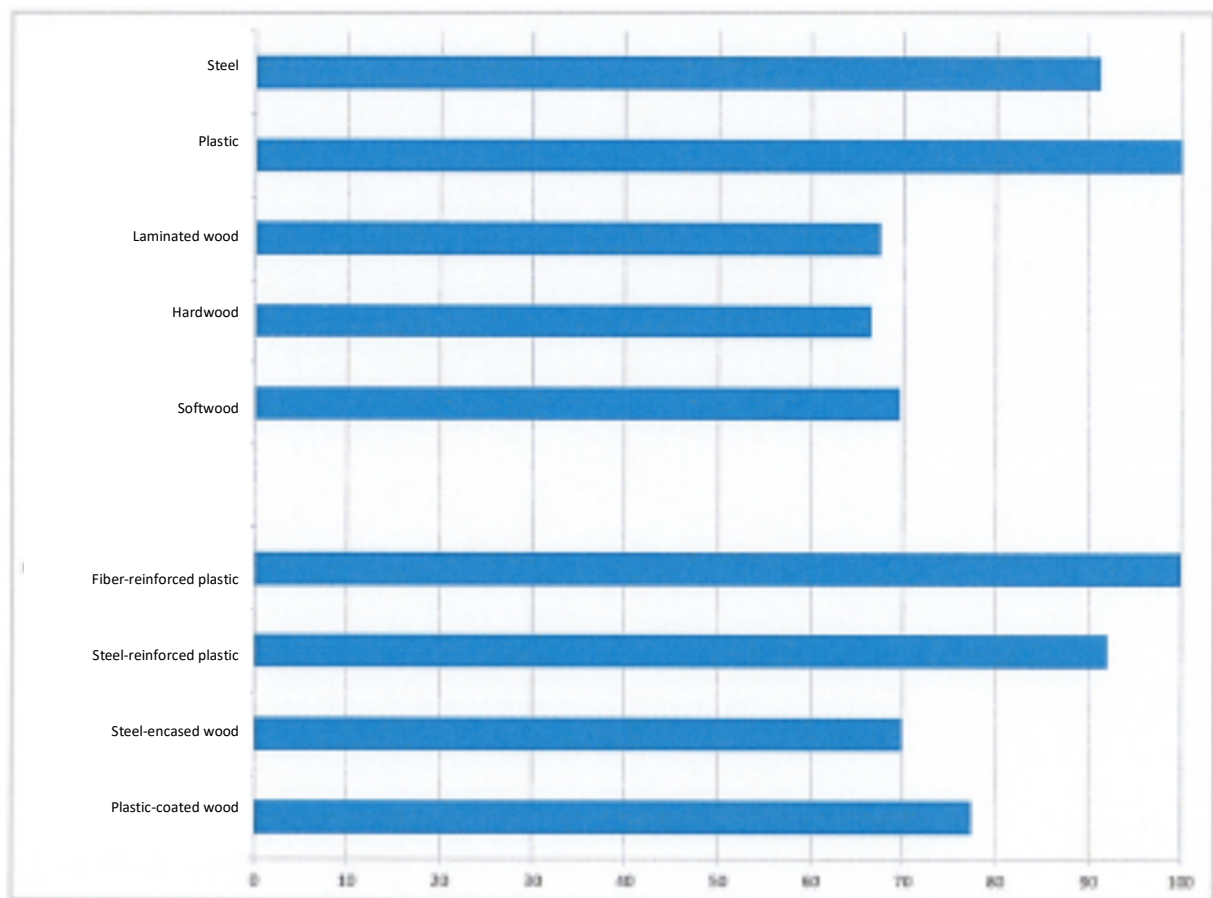


Figure 7: Overall balance of the partial aspects

Table 6: Comparison of properties

Board material	Softwood	Hardwood	Softwood coated (with polyurethane ²)	Plastic in honeycomb structure with steel braces	Plastic with glass fiber	Steel board
Tensioning	Lateral, threaded rods	Lateral, threaded rods	Lateral, threaded rods	None	None	None
Boundary	C-Profile	C-Profile	C-Profile	None	None	None
Option					C-Profile edge	
Origin	Certified	No	Wood certified	Plastic: industrial scrap	Plastic: industrial scrap	
Weight (1400x1000x50)	Approx. 45 kg [2] Approx. 3-5 kg steel [3]	Approx. 94 kg [4] Approx. 3.5 kg steel [3]	Approx. XX kg [4] Approx. 3.5 kg steel [3]	<30 kg [2]	Approx. 80-95 kg [4]	Approx. 218 kg [4]; 18 mm solid material
Operating time ³ (condition reconditioning)	6-10 years*	15-20 years ¹	8-20 years	Up to 20 years	>20 years ¹	>20 years
Reconditioning ¹	With regrinding*1	*with regrinding	Non	None	With regrinding*1	
Water resistant	Yes, with regular care	Yes, with occasional care	Yes	Yes	Yes	Yes, with occasional care
Impact rigidity (softwood 100%)	Low 100%	Medium 118%	Medium	Medium	High 193%	Very high 202%
Flexural modulus	Low	Medium	Low	Higher	High	Medium
Possible compaction effect	Low	Medium	Medium	Medium	High	Very high
Ageing	Gets softer	Gets softer	Abrasion	Abrasion	Abrasion	Corrosion

¹ Reconditioning

² the manufacturers use different plastic coatings

³ depending on the type of use, quality- and tolerance requirements
[5], [6], [7], [8], [9]

Table of Figures

Figure 1: Common Board Types [1].....	3
Figure 2: Diagram of the measurement of acceleration peaks as one of the investigated physical properties in the technology centre of IAB Weimarg GmbH	4
Figure 3: Board comparison according to physical properties.....	5
Figure 4: Board comparison according to handling in the production process	6
Figure 5: Board comparison according to economical aspects	7
Figure 6: Board comparison according to ecological aspects	8
Figure 7: Overall balance of the partial aspects.....	9

List of Tables

Table 1: Weighting of the physical properties.....	5
Table 2: Weighting of the handling in the production process	6
Table 3: Weighting of the economical aspects	7
Table 4: Weighting of the ecological aspects	8
Table 5: Weighting of the partial aspects in the overall balance.....	9
Table 6: Comparison of properties	10

Bibliography and Source References

- [1] WASA AG: Brochures: High Performance and Flexibility.
- [2] WASA AG (www.wasa-technologies.com): Production boards made from wood. In: BWI - BetonWerk International. 3 (2017).
- [3] IAB Weimar gGmbH: Internal Reports.
- [4] Manufacturing technique, SLG-Working Committee: Data sheet Production boards for the precast concrete block industry. Bonn : Fachvereinigung für Straßen-, Landschafts- und Gartenbau e.V. 2002.
- [5] Characteristic values for the description of the dynamic properties of production boards. Palzer, Ulrich and Martin, Jürgen.: 9, 2010, Bd. BFT_INTERNATIONAL.
- [6] Production boards - durable and robust. HOLZWERK VITZTHUM.: 10, 2012, Bd. BFT_INTERNATIONAL.
- [7] Thomas-Eisenhandel GmbH.: Stahl Paletten. [Online] <http://www.thomas-eisen.de/Stahl-Paletten.htm>.
- [8] Holzwerk Vitzthum GmbH: Unterlagsplatten. [Online] <https://www.holzwerk-vitzthum.com/deutsch/unterlagsplatten/>.
- [9] MYWOOD POLOMKA TIMBER S.R.O.: [Online] <http://www.avr-reddenneier.de/mywood/produkte/schalungsplatten0.html>.