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Case reference ID (to be given in all communications)  
 21.61-21izbo/021-2101#065-(544/16-Zul)

**Subject:** Approval of FFU 74 plastic railroad ties from SEKISUI Eslon Neo Lumber  
**Reference:** Your application of 01/12/2016 – Mr. Bretschneider  
**Enclosures:** 0

Dear Ladies and Gentlemen,

In response to your application for approval of the FFU 74 plastic railroad ties from SEKISUI Eslon Neo Lumber, I have decided as follows:

### Decision

I. I approve the FFU 74 plastic railroad ties from SEKISUI Eslon Neo Lumber for use by federal railroad companies.

This approval is valid until 31/03/2022.

This decision contains 6 pages and may be used only as a whole.

The FFU 74 plastic railroad ties from SEKISUI Eslon Neo Lumber are manufactured from polyurethane reinforced with glass fiber of 740 kg/m<sup>3</sup> density. Depending on dimensions, plastic railroad ties may be used on the top of breakstone ballast, under rails, switches and bridges, and on open bridges with ballast-free track surface, as bridge ties.

**Table 1: Areas of application of the FFU 74 plastic ties**

		Dimensionns <sup>1)</sup> [cm]			Axle load [t]	Speed [km/h]	Application limits
		Height	Width	Length			
Breakstone	Track	10	26	240	22.5	≤ 100	- Single tie <sup>2)</sup>
		10	26	260	22.5	≤ 100	- Earthen structure <sup>3)</sup> - Trough structure <sup>4)</sup> - Station <sup>5)</sup>
		12	26	240	22.5	≤ 100	- Trough structure <sup>4)</sup>

						- Station <sup>5)</sup>	
		12	26	240	22.5	≤ 120	- Single tie <sup>2)</sup>
		12	26	260	22.5	≤ 120	- Earthen structure <sup>3)</sup> - Trough structure <sup>4)</sup> - Station <sup>5)</sup>
		14	26	240	22.5	≤ 120	- Trough structure <sup>4)</sup> - Station <sup>5)</sup>
		14	26	240	22.5	≤ 160	- Single tie <sup>2)</sup>
		14	26	260	22.5	≤ 160	- Earthen structure <sup>3)</sup> - Trough structure <sup>4)</sup> - Station <sup>5)</sup>
		16	26	240	22.5	≤ 160	- Trough structure <sup>4)</sup> - Station <sup>5)</sup>
		16	26	240	22.5	≤ 230	- Single tie <sup>2)</sup>
		16	26	260	22.5	≤ 230	
		16	26	260	25.0	≤ 160	
	Switches	16	26	260	22.5	≤ 160	
		16	26	260	25.0	≤ 120	
Bridges <sup>7)</sup> with open deck		12	24	250	22.5	≤ 160	Max. fill <sup>6)</sup> 10 cm
		14	24	250	22.5	≤ 160	Max. fill <sup>6)</sup> 20 cm
		16	24	250	25.0	≤ 160	Max. fill <sup>6)</sup> 25 cm
		16	24	250	22.5	≤ 230	Max. fill <sup>6)</sup> 25 cm
		16	24	250	22.5	≤ 160	Max. fill <sup>6)</sup> 30 cm

- 1) The dimensions are the minimum values that must not be compromised also after combing or milling. Larger dimensions are always acceptable.
- 2) [In the event of collision with an item that must not be removed or modified], such as existing signaling masts or overhead lines, the tie may be shorter, provided that the adjacent ties have the standard length of 2.6 m.
- 3) An earthen structure should be topped with dedicated plinths to increase the transverse resistance:
  - a. For the tie height of 10 cm: 3 plinths sized (H x W x L) 6 x 26 x 15 cm;
  - b. For the tie height of 12 cm: 3 plinths sized (H x W x L) 4 x 26 x 15 cm;
  - c. For the tie height of 14 cm: 3 plinths sized (H x W x L) 2 x 26 x 15 cm.
- 4) On trough design bridges with reduced ballast thickness: acc. to guidelines Ril 820.2010.
- 5) Near a station, on reduced ballast thickness: acc. to guidelines Ril 820.2010 or in shortage of space (e.g., due to the presence of a platform).
- 6) "Fill" means the distance between the rail head and the bridge stringer center.
- 7) A Bridge tie may be raised [above the formation line of the rail line] by max. 60 mm (value  $u$ ) [because the rail can be seated in a milled and combed recess in the tie] but the minimum dimensions of the tie must be observed. [The elevation of a tie may be adjusted] if the fill height ranges from 10 to 30 cm.

II. The approval has been given based on the following documentation. The documentation is an integral part of this Decision and must be followed, unless additional provisions contain more detailed requirements:

- Application for approval of the FFU 74 plastic railroad ties as ties for rails, switches and bridges, dated on 01/12/2016 – Mr. Bretschneider;
- Final report: "Operating trial of the FFU ties (from SEKISUI)" produced by DB Netz AG, I.NPF 111 (G), dated on 27/03/2017;
- Expert engineering feedback on of FFU plastic railroad ties with the design height of 14 cm dated on 20/03/2015, produced by Prof. Dr. Eng. Stephan Freudenstein;
- Report N° 3484: "Transverse resistance of the FFU plastic railroad ties in consolidated ballasted track surface" dated on 24/11/2016, produced by the Road Building Testing Authority of the TU University of Technology in Munich;
- Report N° 3303: "Determination of transverse resistance of the FFU plastic railroad ties in non-consolidated ballasted track surface" dated on 30/12/2015, produced by the Road Building Testing Authority of the TU University of Technology in Munich;