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Draft for Revision of the Standards EN 12640 and EN 12641 Regarding the Securing of Cargo on Road Means of Transport

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Abstract: Since 2014, work regarding the revision of the Standard EN 12642 "Securing of cargo on road vehicles - Body structure of commercial vehicles - Minimum requirements" has been done, which is known for users of CODE XL certified swap bodies. Based on the negotiations on the above-mentioned standard, requirements for the revision of other standards for the cargo securing emerged. Currently, Expert group CEN TC 119 WG 7 is working on these standards. This paper discusses about the standards revision regarding the cargo securing.

Keywords: Expert group CEN TC 119 WG 7, European Standards EN 12640, EN 12641-1, EN 12641-2, Standard revision, cargo securing, road vehicle

1. Introduction

In Berlin, a meeting of expert groups CEN TC 119 WG 7 in regard with the revision of the Standards EN 12640 ("Securing of cargo on road vehicles - Lashing points on commercial vehicle for goods transportation - Minimum requirements and testing") and EN 12641-1, 2 ("Swap bodies and commercial vehicles - Tarpaulins - Part 1: Minimum requirements" and "Swap bodies and commercial vehicles - Tarpaulins - Part 2: Minimum requirements for curtainsiders") 10 – 11th April 2017 was held. Authors of this research study were attended the meeting with the support of the Česmad Slovakia.

Standards are included under the group of Standards cited by Directive 2014/47/EU of the European Parliament and of the Council of 3 April 2014 on the technical roadside inspection of the roadworthiness of commercial vehicles circulating in the Union and repealing Directive 2000/30/EC Text with EEA relevance. Thus, these Standards will be directly used by controllers of cargo securing in the individual EU Member States implementing this Directive into their national

legislation. From 2018, a new Act on the vehicles operation conditions with the relevant decrees in the Slovak Republic will be implemented [1-4].

2. Revision of the Standard EN 12640

EN 12640 is the Standard that defines the minimum requirements for lashing points on commercial vehicles such as number, position (location), strength and lashing points testing. At present, it is no longer sufficient for needs of practice due to the development that goes forward and the fact that the Standard does not define the requirements for the lashing strips (rails) which are already considered as the trend of the current flatbed semi-trailers produced in Germany [3,5].

Insufficient amount of lashing points is also a huge deficiency. The Standard requires 12 pairs of lashing points at least, however, this is insufficient amount for current 13.62 m2 loading platform. There is defined maximum distance between the lashing points at the value of 1,200 mm for cargo securing including palletized load on pallets with dimensions 1,200 x 800 mm and this is also considered as insufficient [3,6].

Lashing angle is another problem. The current Standard defines the lashing point testing at a vertical lashing angle of 30° or more. From this reason, the lashing points have not been tested for lashing angles below 30°. For lashing angles below 30°, direct lashing methods such as loop lashing, diagonal lashing, oblique lashing, and frontal lashing are used. Compared to these methods, top lashing is unsuitable for vertical lashing angles below 30°. During the German inspections, this may mean that the controller considers the securing to be inappropriate, and then, it will be problematic to propose other suitable securing.

The carrier usually requires the flatbed semi-trailer to be as versatile as possible. It means that a semi-trailer is also equipped with the lashing strips and lashing lugs in the floor of the semi-trailer, so that any type of lashing can be applied anywhere, and the user is not limited by the amount of lashing points in the semi-trailer [4,6].

Inappropriate requirements for lashing points are associated with [3, 7-9]:

- inappropriately applied lashing method,

large spacing between the lashing points, so that these spacing causes the cargo is stored with spaces in the most critical direction (forward direction), and subsequently, problems while inspections, cargo and vehicle damages and the threat of other road users in the case of emergency heavy braking,

- inappropriate lashing angles (vertical of 30° - 90°) for lashing points. These lashing angles make difficult to apply direct lashing methods,
- less amount of lashing points causes long frontal lashing by straps and subsequent cargo displacement due to the elasticity of long lashing while heavy braking,

- absence of lashing points in cabin superstructures,
- absence of lashing points in the front wall for its reinforcement by the lashing,
- absence of lashing points in the sidewall pillars for their reinforcement by diagonal lashing.

Based on the expert group meeting, a new tentative draft text of the Standard is going to be prepared which will be sent for vote in order to find out whether the official start on this Standard will be initiated or not. All the experts (representatives of the Slovak Republic, Germany, Sweden and the United Kingdom) agreed that it is necessary to revise this Standard and prepare the draft text of the Standard in order to vote about the works initiation. It was also agreed that the new Standard should, in addition to commercial vehicles, define requirements for intermodal transport units, i.e. swap bodies (interchangeable superstructures/containers), intermodal semi-trailers, and also the requirements for baggage securing in the baggage compartments of buses (buses according to the ISO 3833, point 3.1.2) and wheelchairs for disabled passengers in buses [2,10].

The Standard subject to define minimum requirements and test methods for lashing elements of road vehicles and intermodal transport units for goods transportation has been also agreed. This Standard will not apply to [3]:

- vehicles designed and constructed solely for bulk materials transportation,
- vehicles designed and constructed solely for the specific cargo transportation with special securing requirements,
- vehicles (vans/trucks) according to the ISO 27956,
- freight containers ISO 1.

The Standard should define the requirements for vertical lashing angles of 0° - 90°, longitudinal lashing angles of 0° - 360°, requirements for the lashing points in the box-body semi-trailers including isothermal (after resolving the dispute whether it is really in a contradiction with the HACCP requirements to have lashing points in the isothermal semi-trailer floor). Also, a standardized double-tiered hook of straps should be defined. For this hook, lashing elements and lashing strips (rails) of superstructures will be designed, since different types and dimensions of hooks make it difficult to apply the lashing straps to these lashing elements.

One of the most important requirements is to label the lashing elements indicated on the superstructure, where different forms of labelling by white writing on a blue background are used. Since there are several different solutions, it is appropriate to indicate specific lashing elements, their strength and lashing angles to facilitate operations while securing the cargo by lashing [10].

3. Revision of the Standard EN 12641-1

The Standard defines the minimum requirements for tarpaulins of swap bodies (interchangeable superstructures) and commercial vehicles in terms of strength and stability of tarpaulins. This

Standard determines the strength requirements for tarpaulins materials, tear resistance (tear strength), fire resistance, etc. It also defines such tarpaulins labelling in compliance with the Standard requirements. During the revision, minor changes within the text of the Standard without any substantial changes have been made [3,10].

4. Revision of the Standard EN 12641-2

The official title of this Standard is "Swap bodies and commercial vehicles - Tarpaulins - Part 2: Minimum requirements for curtainsiders". The difference compared to a Part 1 of the Standard consists in the fact that these tarpaulins fulfill the cargo securing function when certifying the EN 12642 Code XL or EN 283 (for swap bodies).

The Standard defines the requirements for reinforcement of the tarpaulin by the tensioning straps which shall not be remote from each other by more than 600 mm in a horizontal or vertical direction. The amount of straps on the sidewall length shall be at least 600 (sidewall length in mm - 600). Strength of vertical straps shall be ≥ 23 kN and horizontal straps ≥ 12 kN [3,10].

The Standard defines the requirements for hooks of straps tensioning the tarpaulin as well, and as a novelty, it also defines a double-tiered hook as a possible variant. For attachment to the superstructure, it determines the minimum distance between the hook saddle and tip by 22.5 mm.

Point 3.5 of the Standard defines the requirements for curtainsiders (tarpaulin sidewalls) for tensioning elements of tarpaulin vertical straps and horizontal tensioning elements where a text about the current system of vertical end bars of tarpaulin is inserted. Vertical end bars cause the tarpaulin stretching (tensioning) across the entire wall by rotating the tarpaulin around one of the bars [11-13].

Several new requirements have been introduced for tarpaulins testing (point 3.5.4.2 - static testing), tarpaulin sample testing (dimensions of 1,200mm x 2,900-3,000mm) with two vertical straps of 600 ± 100mm apart. A vertical force of 8 kN, simulating a cargo pushing on a tarpaulin, acts on this sample for five minutes. In the range of force of 2.5 kN - 8 kN, the calculated mean rigidity of the tarpaulin of the testing sample shall not be greater than 33 N/mm. After this test, a new force test is performed until the sample breaks.

The dynamic test (point 3.5.4.3) is a test of the tarpaulin tensioning strap between two points, while one is deflected using the crank mechanism, which causes a cyclic tensioning and loosening the strap (superstructure wall movements simulation while driving) in the range of ± 15 mm. Tests are performed for the time periods of 1 minute at 4 Hz frequency (4 cycles per 1 second), 2 minutes at 4 Hz and 2 minutes at 8 Hz. After performing these tests, the strap shall not be fully released, and also, slipping the strap from the buckle shall not be greater than 5 mm [14-16].

In point 4, the Standard defines the requirements for curtainsiders labelling in compliance with this Standard.

5. Conclusion

This paper deals with the course of the negotiations TC 119 WG 7, in particular, course of the negotiations about the revision of the Standards EN 12640 ("Securing of cargo on road vehicles - Lashing points on commercial vehicle for goods transportation - Minimum requirements and testing") and EN 12641-1, 2 ("Swap bodies and commercial vehicles - Tarpaulins - Part 1: Minimum requirements" and "Swap bodies and commercial vehicles - Tarpaulins - Part 2: Minimum requirements for curtainsiders"). Within the working group, it is still necessary to resolve several important issues arising from the group's discussions on the Standards mentioned in this paper. These matters are, however, the subject of further negotiations waiting for the working group in the coming months.

References

[1] Jagelcak, J. (2015). Loading and securing of cargo in road transport – 2. ed. Zilina: EDIS – publisher University of Zilina, Slovak Republic.

[2] Jagelcak, J. & Zamecnik, J. (2015). The stress of lashing points in full-loaded 3.5-tonne van during emergency braking. In LOGI 2015 (pp. 136-152). Pardubice, Czech Republic, from http://logi.upce.cz/issues/2015-01/15.pdf.

[3] European standards. (2016). EN 12642. Securing of cargo on road vehicles – Body structure of commercial vehicles – Minimum requirements.

[4] Stopka, O., Gasparik, J. & Simkova, I. (2015). The methodology of the customers' operation from the seaport applying the "Simple Shuttle Problem". Nase More, 62(4), 283-286. DOI: 10.17818/NM/2015/4.7.

[5] Vlkovsky, M., Pochobradska, K., Foltin, P., Zajicek, V. & Binar, T. (2016). The cargo securing based on European standards and its applicability in off-road transport conditions. In 3rd International Conference on Traffic and Transport Engineering (ICTTE), 24-25 November 2016 (pp. 603-607). Belgrade, Serbia: Scientific research center LDT Belgrade. ISBN 978-86-916153-3-8.

[6] Zong, C.Q., Zhang, H.W., Huang, C.Z. & Dong, J.S. (2017) Research on the Influence of Cargo Securing Force with Typical Road Alignments and Vehicle Working Conditions. In 4th International Conference on Transportation Information and Safety (ICTIS), 08-10 August 2017 (pp. 27-32). Banff, Canada: IEEE. ISBN 978-1-5386-0437-3.

[7] Cho, S.I., Hwang, J.O., Bang, C.S. & Bae, J.H. (2016). Assessment procedures for mechanical securing components of LNG cargo containment system with potential damages. In 35th ASME International Conference on Ocean, Offshore and Arctic Engineering, 19-24 June 2016 (Article Number: UNSP V003T02A023). Busan, South Korea: AMER SOC MECHANICAL ENGINEERS. ISBN:978-0-7918-4994-1

[8] Muzaffarova, M. & Mirakhmedov, M. (2016). Prospects fixation drift sands physicochemical method. Transport Problems, 11(3), 143-152. DOI: 10.20858/tp.2016.11.3.14.

[9] Krile, S., Peraković, D. & Remenar, V. (2009). Possible Collision Avoidance with Off-Line Route Selection. Promet & Transportation, 21(6), pp. 415-423. ISSN 0353-5320.

[10] Lorenc, A., Michnej, M. & Szkoda, M. (2014). An information system aiding the processes of cargo loading and securing in railway transport. In Carpathian Logistics Congress (CLC), 09-11 December 2013 (pp. 595-600). Cracow, Poland: Tanger LDT. ISBN 978-80-87294-50-5.

[11] Kabacinski, J. & Wisnicki, B. (2009). Accuracy analysis of stowing computations for securing non-standard cargoes on ships according to IMO CSS Code. Polish maritime research, 16(2), 67-71. DOI: 10.2478/v10012-008-0024-6.

[12] Wiśnicki, B. & Dyrda, A. (2016). Analysis of the intermodal transport efficiency in the Central and Eastern Europe. Nase More, 63(2), 43-47. DOI: 10.17818/NM/2016/2.1.

[13] Gnap, J., Kalasova, A., Gogola, M. & Ondrus, J. (2010). The Centre of Excellence for transport service and control. Komunikacie, 12(3), 116-120. ISSN 1335-4205.

[14] Brosi, S. (2012). Technical approach to secure cargo tracking and monitoring at border crossings. In 19th Intelligent Transport Systems World Congress, ITS 2012, 22-26 October 2012 (pp. AM-00068). Vienna, Austria. Code 101478.

[15] Ducarne, L., Ainalis, D. & Kouroussis, G. (2018). Assessing the ground vibrations produced by a heavy vehicle traversing a traffic obstacle. Science of the Total Environment, 612, 1568-1576. DOI: 10.1016/j.scitotenv.2017.08.226.

[16] Wang, Q.W., Li, W.F. & Zhao, J. (2015). Design and Implementation of an Intelligent System for Seafarers' "Cargo stowage and securing" Assessment. In International Symposium on Computers and Informatics (ISCI), 17-18 January 2015 (pp. 2483-2490). Beijing, China: Atlantis press. ISBN 978-94-62520-56-1.