DOCUMENTATION

Mobile Stage

ARCUM X48

8,0m x 6,0m

LUMEX
PRODUCENT KONSTRUKCJI ALUMINIOWYCH
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P.U.H.P. LUMEX Leszek Pióro, Waldemar Pióro
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LOAD APPROVAL

NR EM4381/01/2017

Subject: Mobile Stage 8,0m x 6,0m x 5,1m
VIN SUCE6APA9H1004381

Stage floor – uniformly distributed load	**500kg/m²**
Roof – Middle part – uniformly distributed load	**1000kg**
Roof – Side parts - uniformly distributed load	**350kg**
QUADRO 250 column	**50 kg**

Materials : - aluminium PA38 (AlMgSi0,5 F22 T6)
- steel S235JRH

Material approvals and technical documentation can be found in the enterprise. Maximum load was determined on the basis of static calculations.

Manufacturer: P.U.H.P. LUMEX
Leszek Pióro, Waldemar Pióro
ul. Dolne Młyny 77
59-700 Bolesławiec

Confirms the compliance of the above data:

PRZEDSIĘBIORSTWO "LUMEX"
Usługowo-Handlowo-Produkcyjne
Leszek Pióro, Waldemar Pióro
59-700 Bolesławiec, ul. Dolne Młyny 77
tel. (075) 734-59-40, fax (075) 734-59-50
NIP 612-000-46-21 Regon 003298253

Signature

Bolesławiec, 26.07.2017r.

P.U.H.P. LUMEX Leszek Pióro, Waldemar Pióro
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LOAD APPROVAL

NR EM4381/02/2017

Subject: Mobile Stage 8,0m x 6,0m x 5,1m
VIN SUCE6APA9H1004381

Maximum parameters of the atmospheric conditions:

- wind	**70 km/h**
- snow	**8,0 cm**

Materials : - aluminium PA38 (AlMgSi0,5 F22 stan T6)
- steel S235JRH
- PCV 650g/m^2

Material approvals and technical documentation can be found in the enterprise. Maximum load was determined on the basis of static calculations.

Manufacturer: P.U.H.P. LUMEX
Leszek Pióro, Waldemar Pióro
ul. Dolne Młyny 77
59-700 Bolesławiec

Confirms the compliance of the above data:

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Signature

Bolesławiec, dnia 26.07.2017r.

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DECLARATION OF CONFORMITY
Nr EM4381/03/2017

1. Manufacturer:

PUHP Lumex Leszek Pióro Waldemar Pióro
59-700 Bolesławiec, ul. Dolne Młyny 77

2. Subject:

Mobile stage, stage dimensions 8,00m x 6,00m, profiled roof,
roof system – rope hoists.
VIN SUCE6APA9H1004381

3. Classification:

PKWiU 28.11.10-50.90

4. Purpose:

Stage with roof for concerts, artistic performances.

5. Documentation:

Technical Documentation. Approvals for the materials.
Technical conditions of installation and use.

6. Aluminium profile standards:

PN-EN 10002-1, PN-EN ISO 377, PN-91/H04313, ISO 9001:2000, ISO 14001:1996

7. PCV roof cover standard:

EN 13501-1:2007

8. Net courtains standard:

DIN 4102-1 B1

9. Non-slip, waterproof plywood standards:

EN-PN 635, ISO 3759, DIN 75200, SFS 5337

10. All the work carried out according to the guidelines contained in the standards:

EN 1090, EN ISO 3834-2, DIN 4113-3, DIN 18800-7, DIN 4112, DIN EN 13200, PN-EN 1993, PN-EN ISO 10042, PM-EN ISO 8503-2, PN-EN ISO 5817, PN-B- 06200, PN-B-03220, PN-B-03200, P-EN ISO 12944

We declare with full responsibility that the products in point. 2 are consistent with the reference documents mentioned in point. 5 points. 6 points. 7 points. 8 points. 9 points. 10

CE

PRZEDSIĘBIORSTWO "LUMEX"
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NIP 612-000-40-21 Regon 003288253

Bolesławiec, 26.07.2017r.

Signature

Polski

1 KWALIFIKOWANIE TECHNOLOGII SPAWANIA
2 Certyfikat nr
3 Jednostka inspekcyjna
4 Nr akt Instrukcja spawania wytwórcy
5 WPS nr
WPQR-nr
Rewizja
6 Wytwórca
Sprawa nr
7 Adres
8 Przepisy/norma dotycząca badań
9 ZAKRES UZNANIA
10 Proces spawania
11 Rodzaj/wykonanie ściegu
12 Rodzaj spoiny
13 Materiał podst./grupa
14 Grubość materiału podstawowego
15 Średnica zewnętrzna rury
16 Rodzaj spoiwa
17 Rodzaj gazu osłonowego/topnika
18 Rodzaj prądu spawania
19 Doprowadzenie ciepła
20 Pozycja spawania
21 Temperatura podgrzewania wstępnego
22 Temperatura międzyściegowa
23 Obróbka cieplna po spawaniu
24 Ograniczenia dotyczące temperatury
25 ROZSZERZENIA/OGRANICZENIA
26 WSKAZÓWKI SPECJALNE DLA WYTWARZANIA
27 POŚWIADCZENIA ZAPEWNIENIA JAKOŚCI
28 Wskazówka: Uzupełnienia i powtórzenia kwalifikowania technologii spawania uregulowano w instrukcji AD 2000-Merkblatt HP 2/1 punkt 8 i należy je potwierdzić oddzielnie. Przy istotnych zmianach ustalonych warunków są wymagane badania uzupełniające. Badania uzupełniające mogą być wykonane jako próby robocze. Jeżeli przerwa w wytwarzaniu zbiorników lub części ciśnieniowych jest dłuższa niż 1 rok, wówczas dla
29 wznowienia produkcji wymagane jest powtórzenie przeprowadzenia kwalifikowania technologii spawania.
Niniejszym potwierdza się, że złącze próbne przygotowano, spawano i badano zgodnie z wymaganiami wyżej wymienionych przepisów i norm oraz uzyskano wynik pozytywny. Wymaga-
30 nia zostały spełnione.

Miejscowość
Data wystawienia
Nazwisko i podpis
31 Jednostka inspekcyjna
32 Załączniki
33 Skróty
T:
P:
BW:
FW:
T/P:
ss:
bs:
nb:
mb:
gg:
ng:

English

1 QUALIFICATION OF A WELDING PROCEDURE

2 Certificate No.:
3 Inspecting Authority
4 Contract Ref.
5 WPS No:
WPAR No.:
Revision:
6 Manufacturer:
File No.
7 Address:
8 Code / Testing Standard:
9 RANGE OF APPROVAL
10 Welding Process:
11 Weld type/execution of weld
12 Groove shape
13 Parent metal / group
14 Parent Metal thickness:
15 Pipe Outside Diameter:
16 Filler Metal Type Designation:
17 Gas/ flux:
18 Type of Welding Current:
19 Heat input:
20 Welding Positions:
21 Preheat temperature:
22 Interpass temperature:
23 Post Weld Heat Treatment:
24 Temperature limitation:
25 SCOPE EXTENSION/LIMITATION:
26 SPECIAL ADVICE FOR MANUFACTURING
27 EVIDENCE FOR QUALITY ASSURANCE
28 Note: Supplementary testing and repetition of procedure test are specified in AD 2000-Merkblatt HP 2/1 chapter 8 and has to documented separately. If the specified conditions are altered to any appreciable extent, a supplementary test is required. The supplementary test can be performed as a production test. In the event of the production of pressure vessels or pressure vessel components being discontinued for a period of excess of one year, procedure testing shall be repeated.
29 Certified that test welds were prepared, welded and tested satisfactorily in accordance with the requirements of the code / testing standard indicated above. Requirements are fulfilled.

30 Location
Date of Issue
Name and Signature
31 Inspecting Authority
32 Enclosure
33 Abbreviations:

T:	Pipe
P:	Plate
BW:	Butt weld
FW:	Fillet weld
T/P:	Nozzle weld
ss:	single side
bs:	both side
nb:	without backing
mb:	with backing
gg:	gauging or grinding
ng:	without gauging or grinding

Français

1 QUALIFICATION DE ÚN MODE OPÉRATOIRE DE SOUDAGE
2 Certificat no.
3 Organisme de contrôle
4 Dossier N°
5 DOMS N°
PV QMOS N°
Révision :
6 Fabricateur:
Dossier N°
7 Adresse:
8 Code / Norme d´essal:
9 DOMAINE DE VALIDITÉ
10 Procédé de soudage
11 Type de joint / exécution:
12 Face.
13 Matériel / groupe:
14 Épaisseur du matériel:
15 Diamètre extérieur:
16 Caractéristiques du métal d´apport:
17 Gaz / Flux:
18 Nature de courant de soudage:
19 Apport de chaleur
20 Positions de soudage:
21 Préchauffage température:
22 Température entre passes:
23 Traitement thermique après soudage:
24 Température limitation:
25 EXTENSION/LIMITATION
26 INDICATION POUR FABRICATION
27 PREUVE DE QUALTEE ASSURANCE
28 Compléments et répétition avec épreuves de travail sont commandée en AD 2000 Merkblatt HP 2/1 Ch. 8
Si la fabrication est interrompre plus qu´un année la application du mode de soudage est limitée.

29 Nous certifions que les essais de soudage ont été préparés, soudés et contrôles avec succès, conformément aux exigences du code ou de la norme d´essal cl. dessus mentionné (e).

30 Lieu
Date d´émission
Nom et signature
31 Organisme de Contrôle
32 Annexes
33 Abréviation:

T:	Tuyau
P:	Tôle
BW:	Soudure bout a bout
FW:	Soudure d´ angle
T/P:	Soudure de raccord
ss:	seul cote
bs:	Double cote
nb:	sans support
mb:	avec support
gg:	avec affiler
ng:	sans affiler

for the proof of Fire behaviour according to DIN 4102-1

FIRE LABS
Prüfstelle für das Brandverhalten von Baustoffen
Dipl.-Ing. Uwe Kühnast

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PÜZ-Stelle (LBO): BRA09

TEST REPORT

Reference:	FLT 3527715 (Translation of the German test report - no guarantee for translation of technical terms)
Sponsor:	Plaspack Netze GmbH Dr.-Grobben-Straße 1 A - 4690 Schwanenstadt
Order:	2015-01-22 **Arrived:** 2015-01-29
Description of samples:	Uncoated knitted netting made of polyethylene in different colours and a weight per unit area from 105 g/m^2 to 200 g/m^2 to be used as screen, in textile architecture or for decorative purposes, named "**Austronet 202 B1 / UV**", "**Austronet 700 B1 / UV**", "**Austronet 203 B1 / UV**", "**Austronet 710 B1 / UV**" and "**Austronet 204 B1 / UV**", "**Austronet 720 B1 / UV**". (for details see page 2,3)
Delivered:	2015-01-29
Content of request:	Proof of flammability to classify building materials to class B1 "schwerentflammbar" according to DIN 4102-1
Assessment:	The examined product meets the requirements of class B1 for "schwerentflammbare" (not easily flammable) building materials according to DIN 4102-1, if used suspended freely or with distance of >40 mm to the same or other plain materials (for details see page 5).
Validity of report:	2020-02-29
Sampling:	The material was delivered by the client.

Remark: If the above-mentioned building material is not used as product according to MBO § 2, Abs. 9, Ziffer 1, there is no need for a general building supervisory test report.
This test report is not valid if the examined building material is used as product in the meaning of state building prescriptions (MBO § 17, Abs. 3).

This test report does not replace an eventually necessary proof of applicability concerning building supervisory or building laws in the meaning of state building prescriptions. This has to be verified by:

- "allgemeine bauaufsichtliche Zulassung" (general building inspectorate approval) or by
- "allgemeines bauaufsichtliches Prüfzeugnis (general building inspectorate certificate) or by
- "Zustimmung im Einzelfall (exceptional approval).

This test report can serve as a basis for building supervisory procedures for:

- regulated building products for the pre scribed proofs of conformity
- not regulated building products for the needed proofs of applicability.

This test report comprises 8 pages and 9 enclosures.

This test report must not be published and copied preceding agreement of the test laboratory and if agreed, only during validity and unchanged concerning appearance and contents. Agreement of the test laboratory has to be given in any case if norms in which the tests are based or other technical standards have changed.

FIRELABS DIPL.-ING. U. KÜHNAST

1 Description of test material

1.1 Test material (according to the sponsor)

The delivered materials are knitted nettings made of uncoated polyethylene flat yarn (HDPE) with a yarn thickness of approximately 30 µm. The knitted nettings are intended to be used as screen, in the textile architecture or for decorative purposes and were named with the trade names "Austronet 202 B1 / UV", "Austronet 700 B1 / UV", "Austronet 203 B1 / UV", "Austronet 710 B1 / UV" und "Austronet 204 B1 / UV", "Austronet 720 B1 / UV" by the sponsor.

1.2 Description of the delivered samples

For the tests the laboratory received 9 sections of uncoated knit fabrics (ribbon knits) made of plastic fibers. The materials consisted of plain, uncoated plastic tapes (flat yarn). The transversely and parallel to each arranged flat yarns were connected by longitudinally arranged flat yarns in mesh-like thread loops.

All samples were marked with the trade name. For the tests the laboratory received sections of materials with the following characteristics:

trade name	dimensions	colour	nominal weight
"Austronet 202 B1 / UV" und "Austronet 700 B1 / UV"	length: ca. 4m width: ca. 2 m	black, blue, white	105 g/m^2
"Austronet 203 B1 / UV" und "Austronet 710 B1 / UV"	length: ca. 1m width: ca. 1 m		140 g/m^2
"Austronet 204 B1 / UV" und "Austronet 720 B1 / UV"	length: ca. 4m width: ca. 2 m		200 g/m^2

Characteristic values: see paragraph 4.1; photos: see enclosures 4-9.
Other specifications are not known to the laboratory, samples are stored.

2 Preparation of samples

For the small burner (Brennkasten) test from all delivered materials samples for edge flame exposure (dimensions 190 mm x 90 mm) and samples for surface flame exposure (dimensions 230 mm x 90 mm) have been cut in longitudinal and transverse directions.

For the tests in the fire shaft (Brandschacht) 12 specimens were assembled, each specimen consisted of 4 samples each. From each of the products with the smallest and highest weight per unit area in each of the supplied colors the samples with dimensions 1000 mm x 190 mm have been cut each in longitudinal and transverse direction.
(Assignment of the samples see page 5 and 7)

Afterwards all samples were kept in a climate chamber acc. DIN 50014-23/50-2 until they reached constant weight.

3 Arrangement of samples

The tests in the fire shaft ("Brandschacht") have been performed acc. DIN 4102-1 and -16 (building materials class B1). The the small burner ("Brennkasten") tests have been performed acc. DIN 4102-1, chapter 6.2.5 (building materials class B2).

Arrangement of all samples: single layered, freely suspended.

Examination period: March 2015

4 Results

- Table 1 Material characteristics
- Table 2.1-2.6 Test results class B2 (Brennkasten), see enclosures 1-3
- Table 3.1-3.2 Test results class B1 (Brandschacht)

4.1 Material characteristics

Table 1

trade name	colour	manufacturer's data	measured values		
		weight per unit area [g/m²]	thickness (m.v.) [mm]	thickness (s) [mm]	weight per unit area [g/m²]
"Austronet 202 B1 / UV" and "Austronet 700 B1 / UV"	black	105	1,29	0,041	112
	blue		1,15	0,036	107
	white		1,36	0,072	109
"Austronet 203 B1 / UV" and "Austronet 710 B1 / UV"	black	140	1,21	0,033	131
	blue		1,26	0,034	140
	white		1,32	0,018	133
"Austronet 204 B1 / UV" and "Austronet 720 B1 / UV"	black	200	1,73	0,020	210
	blue		1,56	0,055	192
	white		1,42	0,054	196

./. not received/not measured
m.v. mean value
s standard deviation

4.2 Results of the fire behaviour

4.2.1 Test results class B2 (Brennkasten)

All building materials class B1 must also meet the requirements of materials class B2 (flammable). The material, tested in "Brennkasten" acc. DIN 50 050 meets the requirements class B2; the material does not show burning particles/droplets during these tests.
(Results see enclosures 1-3, tables 2.1-2.6)

4.2.2 Test results class B1 (Brandschacht)

The results of these tests are summarized in the following tables:

3.1 Tests on article "Austronet 202 B1 / UV" and "Austronet 700 B1 / UV" (minimum weight per unit area)

3.2 Tests on article "Austronet 204 B1 / UV" and "Austronet 720 B1 / UV" (maximum weight per unit area)

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Table 3.1

Test results "Brandschachtprüfung" (part 1)								
line no.		test results specimen-no.						
		A	B	C	D	E	F	require-ments
1	Number of specimen arrangement acc. DIN 4102 –15 Table 1	1	1	1	1	1	1	
2	Maximal flame height above bottom edge ..... cm	20	20	20	20	20	20	*)
3	Time [1] ..... min	1	1	1	1	1	1	
4	Burning / melting through Time [1] .....min	1	1	1	1	1	1	
	Reverse side of samples:							
5	Flames / glowing Time [1] .....min:s	./.	./.	./.	./.	./.	./.	
6	Discolouring Time [1] .....min:s	./.	./.	./.	./.	./.	./.	
	Falling of burning droplets	No	No	No	No	No	No	
7	Begin [1].....min							
	Extend:							
8	Sporadic falling of burning droplets							
9	Continuous falling of burning droplets							
	Falling of burning parts	No	No	No	No	No	No	
	Begin [1].....min:s							
10	Extend:							
11	Sporadic falling of burning parts							
12	Continuous falling of burning parts							
13	Afterflame time at the bottom of the sieve (max.) ..... min:s	./.	./.	./.	./.	./.	./.	
	Impairment of the burner flames by dropping or falling Material	No	No	No	No	No	No	
14	Time [1] .....min:s							
15	Premature end of test	No	No	No	No	No	No	
16	Final occurrence of burning at the specimen [1].....min	4	3	3	3	4	3	
	Time of eventually end of test [1] .....min:s							

[1] Indication of time: from the beginning of testing procedure
- No data / Not tested
./. Not occurred
*) No cause for complaint

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Test results "Brandschachtprüfung" (part 2)								
line no.		test results specimen-no.						
		A	B	C	D	E	F	require-ments
	Afterflame after end of test							
17	Time .....min:s	No	No	No	No	No	No	
18	Number of samples							
19	Front side of sample							
20	Back side of sample							
21	Flame length .....cm							
	Afterglow after end of test							
22	Time .....min:s	No	No	No	No	No	No	
23	Number of sample							
	Place of appearance:							
24	Lower half of sample							
25	Upper half of sample							
26	Front side of sample							
27	Back side of sample							
	Smoke density							
28	≤ 400 % min							
29	≥ 400 % min (very strong smoke density)	1,49	1,56	1,85	0,27	0,34	2,21	
30	Diagram fig. no.	./.	./.	./.	./.	./.	./.	
	Residual length							
31	Individual value .....cm	35 50 56 43	52 52 50 48	57 51 50 50	53 57 55 57	55 48 55 55	47 58 55 54	> 0
32	Average value .....cm	**46**	**50**	**52**	**55**	**53**	**53**	≥ 15
33	Photo of the test specimen fig. no.	2	4	6	8	10	12	
	Flue gas temperature							
34	Maximum of average value.°C	112	113	110	112	111	114	≤ 200
35	Time [1] .....min:s	10:00	9:54	9:46	9:48	9:52	9:38	
36	Diagram fig. no.	1	3	5	7	9	11	
37	Remarks: Line 32: There were no additional tests proceeded, because of the residual length of more then 45 cm. (Graphs and photos: see enclosures)							

[1] Indication of time: from the beginning of testing procedure
- Not tested
./. Not occurred
*) No cause for complaint

test specimen	test-no.	product	colour	sample direction
A	527715-001	"Austronet 202 B1 / UV" and "Austronet 700 B1 / UV"	black	longitudinal
B	527715-002			transverse
C	527715-003		blue	longitudinal
D	527715-004			transverse
E	527715-005		white	longitudinal
F	527715-006			transverse

Table 3.2

Test results "Brandschachtprüfung" (part 1)								
line no.		test results specimen-no.						
		G	H	I	K	L	M	require-ments
1	Number of specimen arrangement acc. DIN 4102 –15 Table 1	1	1	1	1	1	1	-
2 3	Maximal flame height above bottom edge ..... cm Time [1] ..... min	20 1	20 1	20 1	20 1	20 1	20 1	*)
4	Burning / melting through Time [1] .....min	1	1	1	1	1	1	-
5 6	Reverse side of samples: Flames / glowing Time [1] .....min:s Discolouring Time [1] .....min:s	./. ./.	./. ./.	./. ./.	./. ./.	./. ./.	./. ./.	- -
7 8 9	Falling of burning droplets Begin [1].....min Extend: Sporadic falling of burning droplets Continuous falling of burning droplets	No	Yes 2	Yes 5	Yes 4	Yes 4	No	-
10 11 12	Falling of burning parts Begin [1].....min:s Extend: Sporadic falling of burning parts Continuous falling of burning parts	No	No	No	No	No	No	-
13	Afterflame time at the bottom of the sieve (max.) ..... min:s	./.	0:07	0:05	0:09	0:11	./.	-
14	Impairment of the burner flames by dropping or falling Material Time [1] .....min:s	No	No	No	No	No	No	-
15 16	Premature end of test Final occurrence of burning at the specimen [1].....min Time of eventually end of test [1] .....min:s	No 3	No 6	No 7	No 7	No 7	No 6	- -

[1] Indication of time: from the beginning of testing procedure
- Not tested
./. Not occurred
*) No cause for complaint

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Test results "Brandschachtprüfung" (part 2)								
line no.		test results specimen-no.						
		G	H	I	K	L	M	require-ments
	Afterflame after end of test	No	No	No	No	No	No	-
17	Time .....min:s							
18	Number of specimen							
19	Front side of specimen							
20	Back side of specimen							
21	Flame length .....cm							
	Afterglow after end of test	No	No	No	No	No	No	-
22	Time .....min:s							
23	Number of specimen							
	Place of appearance:							
24	Lower half of specimen							
25	Upper half of specimen							
26	Front side of specimen							
27	Back side of specimen							
	Smoke density							
28	≤ 400 % min	4,81	0,99	1,79	2,79	6,28	8,7	
29	≥ 400 % min (very strong smoke density)	./.	./.	./.	./.	./.	./.	
30	Diagram fig. no.	14	16	18	20	22	24	
	Residual length							
31	Individual value .....cm	62 40 39 40	58 44 60 58	59 64 50 41	55 60 55 59	50 47 51 53	40 62 63 56	> 0
32	Average value .....cm	**45**	**55**	**53**	**57**	**50**	**55**	≥ 15
33	Photo of the test specimen fig. no.	13	15	17	19	21	23	
	Flue gas temperature							
34	Maximum of average value °C	115	118	111	110	106	111	≤ 200
35	Time [1] .....min:s	6:46	9:48	9:58	1:34	9:38	9:50	
36	Diagram fig. no.	14	16	18	20	22	24	
37	Remarks: line 13: Afterflame time at the bottom of the sieve < 20 sec. is not rated as "falling of burning parts or droplets" line 32: There were no additional tests proceeded, because of the residual length of more then 45 cm. (Graphs and photos: see enclosures)							

[1] Indication of time: from the beginning of testing procedure
- No data / Not tested
./. Not occurred
*) No cause for complaint

test specimen	test-no.	product	colour	sample direction
G	527715-007	"Austronet 204 B1 / UV" and "Austronet 720 B1 / UV"	black	longitudinal
H	527715-008			transverse
I	527715-009		blue	longitudinal
K	527715-010			transverse
L	527715-011		white	longitudinal
M	527715-012			transverse

5 Assessment

According to the test results in section 4.2 the material, described in section 1 and 4.1, fulfils the requirements of building materials class B1 according to DIN 4102-1 if the material is used suspended freely or with a distance of > 40 mm to the same or other plain materials.

The test results are valid for the tested weight per unit area from 105 g/m^2 - 200 g/m^2 and dyed in any color

The requirements of building materials class B2 are also fulfilled, no falling of burning parts or droplets occurred during this tests.

The proof of the use after

- exposure to outdoor climate conditions

was not subjects of the tests.

6 Special remarks

This report is only valid for the material as described under paragraph 1 and 4.1. In combination with other materials or with additional coatings or grounds etc. the burning behaviour may differ. This test report is not valid for the exposure to outdoor climate conditions.

This test report is not valid, as soon as the product is used as a building product in the sense of the "Landesbauordnungen" (state building regulations, MBO § 17, par. 3).

This test report is no substitute for a General Building Inspectorate Certificate.

This test report is granted without prejudice to the rights of third parties, or particular private proprietary rights.

In General Building Inspectorates procedures this test report can be based for

- regulated building materials for the required proof of accordance
- for not regulated building materials for the required proof of applicability.

This test report is valid until 2020-02-29, provided that the test methods, the classification rules and the technology do not change during this period.

Borkheide, 24th of March 2015

Head of the test laboratory
(Dipl.-Ing. Uwe Kühnast)

In charge for testing
(Dipl.-Ing. Manfred Sailer)

This translation was issued on 27th of April 2015, in a case of doubt the German version is valid solely.

Test results class B2 (Brennkasten)

"Austronet 202 B1 / UV" und "Austronet 700 B1 / UV":

Table 2.1

	blue							white							dim.	require-ments
Sample-No.	1	2	3	4	5	6	-	1	2	3	4	5	6	-	-	-
Ignition of the sample	1	1	1	1	1	1	-	1	1	1	1	1	1	-	s	-
Maximum flame height	3	1	2	3	4	4	-	2	3	2	3	4	3	-	cm	-
Time of the maximum	3	2	2	3	3	3	-	2	2	2	4	3	3	-	s	-
Flame tip reached the 150 mm test mark	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	≥ 20
Flame has extinguished before reaching the test mark	4	3	4	4	4	3	-	3	3	5	4	4	4	-	s	-
Ignition of filter paper	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	1)
Smoke density (visual)	very low							very low							-	-
Flames have been extinguished	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	-	-
Afterburning time	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	-	-
View of the samples after the test (20 seconds after exposure the flame): The samples were destroyed at flame impingement area in transverse and longitudinal direction: max. length of approx. 2 cm and approx. 2 cm in width, above sintered about 4-8 cm.																

Samples 1, 2: Edge flame exposure, longitudinal
Sample 3: Surface flame exposure, transverse
Samples 4, 5: Edge flame exposure, longitudinal
Sample 6: Surface flame exposure, transverse

Table 2.2: black, complete set of samples

	longitudinal							transverse							dim.	require-ments
Sample-No.	1	2	3	4	5	6	-	1	2	3	4	5	6	-	-	-
Ignition of the sample	1	1	1	1	1	2	-	1	1	1	1	1	2	-	s	-
Maximum flame height	5	4	4	3	4	4	-	6	3	3	4	4	3	-	cm	-
Time of the maximum	5	4	6	4	3	5	-	5	3	3	3	3	3	-	s	-
Flame tip reached the 150 mm test mark	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	≥ 20
Flame has extinguished before reaching the test mark	14	20	8	4	6	6	-	6	4	5	8	6	4	-	s	-
Ignition of filter paper	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	1)
Smoke density (visual)	very low							very low							-	-
Flames have been extinguished	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	-	-
Afterburning time	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	-	-
View of the samples after the test (20 seconds after exposure the flame): The samples were destroyed at flame impingement area in transverse and longitudinal direction: max. length of approx. 2 cm and approx. 2 cm in width, above sintered about 4-8 cm.																

Samples 1-5: Edge flame exposure
Sample 6: Surface flame exposure

1) No ignition within 20 seconds
./. Not occurred
dim. Dimension
Indication of time: from the beginning of testing procedure
Indication of measurements: from reference line of the flame

FIRELABS ZERTIFIZIEREN ÜBERWACHEN

"Austronet 203 B1 / UV" und "Austronet 710 B1 / UV":

Table 2.3

	blue							white							dim.	require-ments
Sample-No.	1	2	3	4	5	6	-	1	2	3	4	5	6	-	-	-
Ignition of the sample	1	1	2	1	1	2	-	1	1	2	1	1	2	-	s	-
Maximum flame height	2	3	3	4	3	1	-	2	2	2	2	3	2	-	cm	-
Time of the maximum	3	3	4	2	2	3	-	3	2	3	2	3	3	-	s	-
Flame tip reached the 150 mm test mark	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	≥ 20
Flame has extinguished before reaching the test mark	4	4	5	3	4	3	-	4	3	4	3	4	4	-	s	-
Ignition of filter paper	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	1)
Smoke density (visual)	very low							very low							-	-
Flames have been extinguished	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	-	-
Afterburning time	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	-	-
View of the samples after the test (20 seconds after exposure the flame): The samples were destroyed at flame impingement area in transverse and longitudinal direction: max. length of approx. 2 cm and approx. 2 cm in width, above sintered about 2-5 cm.																

Samples 1, 2: Edge flame exposure, longitudinal
Sample 3: Surface flame exposure, transverse
Samples 4, 5: Edge flame exposure, longitudinal
Sample 6: Surface flame exposure, transverse

Table 2.4: black, complete set of samples

	longitudinal							transverse							dim.	require-ments
Sample-No.	1	2	3	4	5	6	-	1	2	3	4	5	6	-	-	-
Ignition of the sample	1	1	1	1	1	2	-	1	1	1	1	1	2	-	s	-
Maximum flame height	4	3	4	3	5	2	-	2	2	2	3	3	1	-	cm	-
Time of the maximum	4	4	4	3	4	3	-	2	2	2	2	3	4	-	s	-
Flame tip reached the 150 mm test mark	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	≥ 20
Flame has extinguished before reaching the test mark	5	4	4	3	5	4	-	3	5	4	5	3	4	-	s	-
Ignition of filter paper	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	1)
Smoke density (visual)	very low							very low							-	-
Flames have been extinguished	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	-	-
Afterburning time	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	-	-
View of the samples after the test (20 seconds after exposure the flame): The samples were destroyed at flame impingement area in transverse and longitudinal direction: max. length of approx. 2 cm and approx. 3 cm in width, above sintered about 2-5 cm.																

Samples 1-5: Edge flame exposure
Sample 6: Surface flame exposure

1) No ignition within 20 seconds
./. Not occurred
dim. Dimension
Indication of time: from the beginning of testing procedure
Indication of measurements: from reference line of the flame

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"Austronet 204 B1 / UV" und "Austronet 720 B1 / UV":

Table 2.5

	blue							white							dim.	require-ments
Sample-No.	1	2	3	4	5	6	-	1	2	3	4	5	6	-	-	-
Ignition of the sample	1	1	2	1	1	2	-	1	1	2	1	1	2	-	s	-
Maximum flame height	2	3	2	5	4	2	-	3	3	2	2	4	4	-	cm	-
Time of the maximum	5	5	6	5	5	5	-	5	6	7	5	6	6	-	s	-
Flame tip reached the 150 mm test mark	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	≥ 20
Flame has extinguished before reaching the test mark	6	6	6	6	5	6	-	6	7	8	5	6	7	-	s	-
Ignition of filter paper	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	[1]
Smoke density (visual)	very low							very low							-	-
Flames have been extinguished	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	-	-
Afterburning time	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	-	-
View of the samples after the test (20 seconds after exposure the flame): The samples were destroyed at flame impingement area in transverse and longitudinal direction: max. length of approx. 4 cm and approx. 2 cm in width, above sintered about 3-8 cm.																

Samples 1, 2: Edge flame exposure, longitudinal
Sample 3: Surface flame exposure, transverse
Samples 4, 5: Edge flame exposure, longitudinal
Sample 6: Surface flame exposure, transverse

Table 2.6: black, complete set of samples

	longitudinal							transverse							dim.	require-ments
Sample-No.	1	2	3	4	5	6	-	1	2	3	4	5	6	-	-	-
Ignition of the sample	1	1	1	1	1	4	-	1	1	1	1	1	3	-	s	-
Maximum flame height	4	1	3	2	4	2	-	5	6	5	5	5	5	-	cm	-
Time of the maximum	10	2	4	7	5	5	-	15	15	13	13	14	17	-	s	-
Flame tip reached the 150 mm test mark	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	≥ 20
Flame has extinguished before reaching the test mark	11	3	10	9	14	6	-	31	16	34	31	22	17	-	s	-
Ignition of filter paper	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	s	[1]
Smoke density (visual)	very low							very low							-	-
Flames have been extinguished	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	-	-
Afterburning time	./.	./.	./.	./.	./.	./.	-	./.	./.	./.	./.	./.	./.	-	-	-
View of the samples after the test (20 seconds after exposure the flame): The samples were destroyed at flame impingement area in transverse and longitudinal direction: max. length of approx. 2 cm and approx. 2 cm in width,																

Samples 1-5: Edge flame exposure
Sample 6: Surface flame exposure

[1] No ignition within 20 seconds
./. Not occurred
dim. Dimension
Indication of time: from the beginning of testing procedure
Indication of measurements: from reference line of the flame

Test specimen A

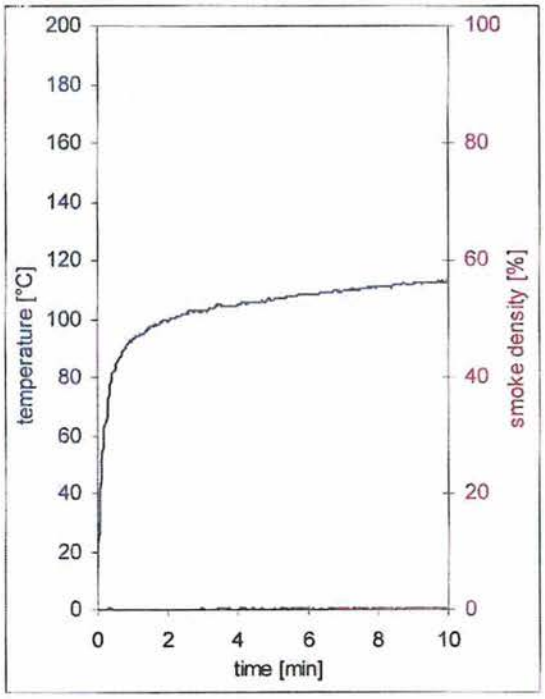

fig. 1
Graphs of the flue gas temperature and the smoke density

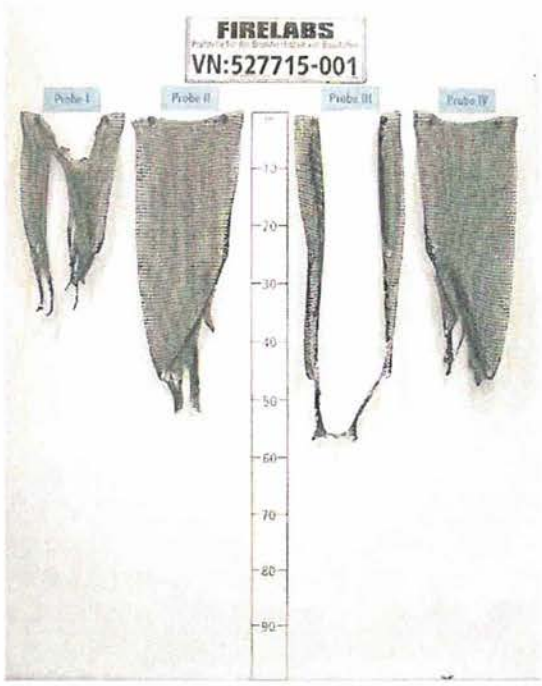

fig. 2
Photo of test specimen after the test

Test specimen B

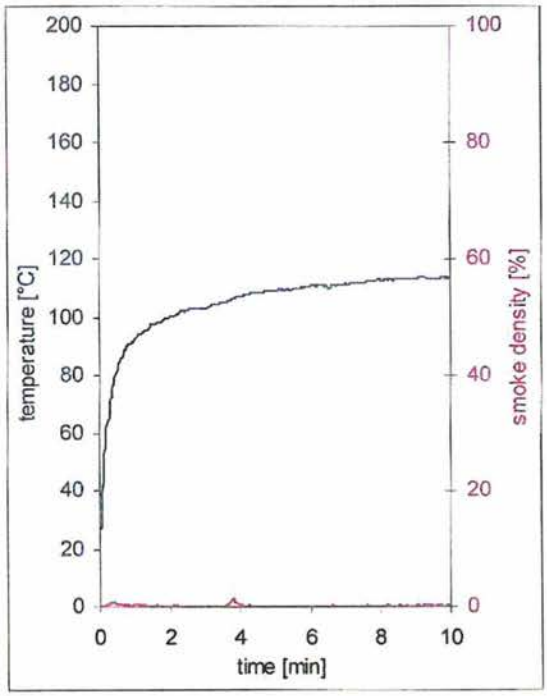

fig. 3
Graphs of the flue gas temperature and the smoke density

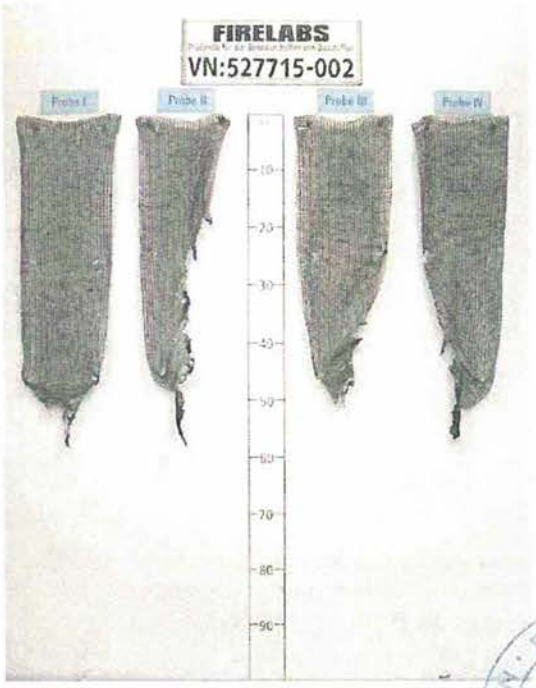

fig. 4
Photo of test specimen after the test

Test specimen C

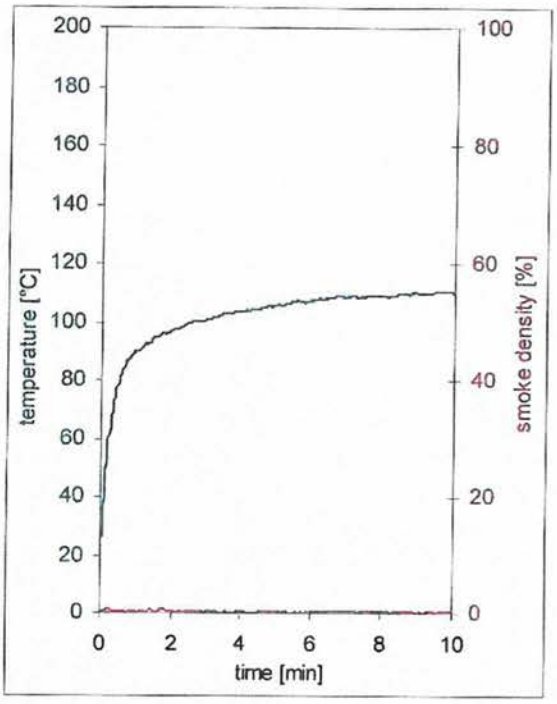

fig. 5
Graphs of the flue gas temperature and the smoke density

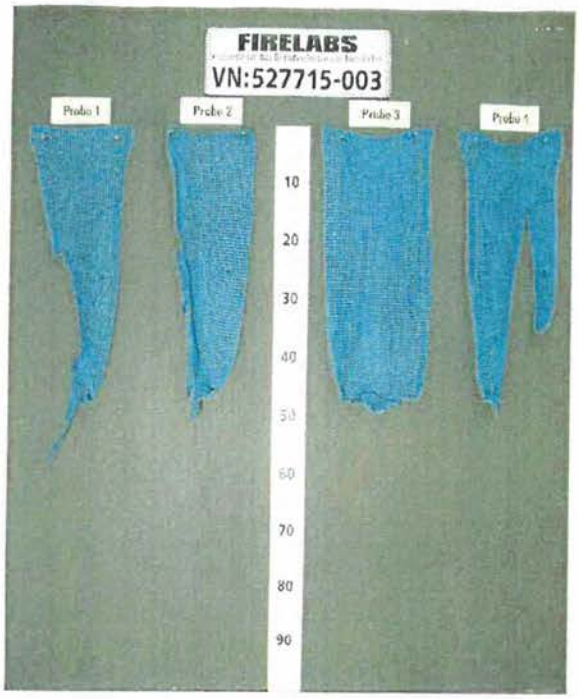

fig. 6
Photo of test specimen after the test

Test specimen D

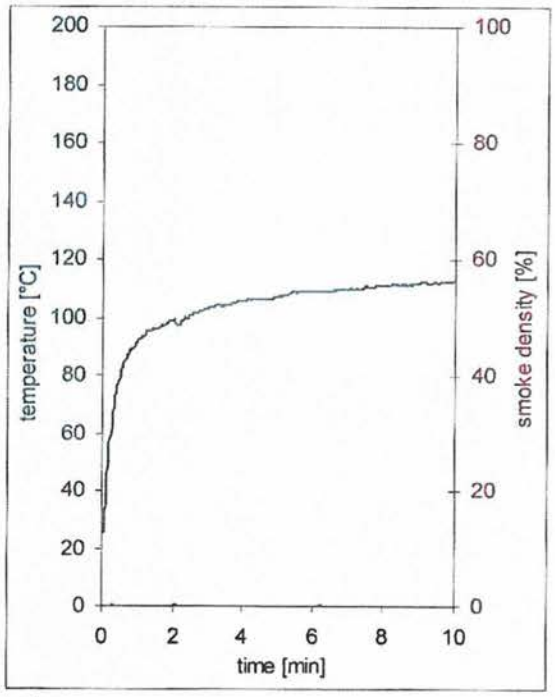

fig. 7
Graphs of the flue gas temperature and the smoke density

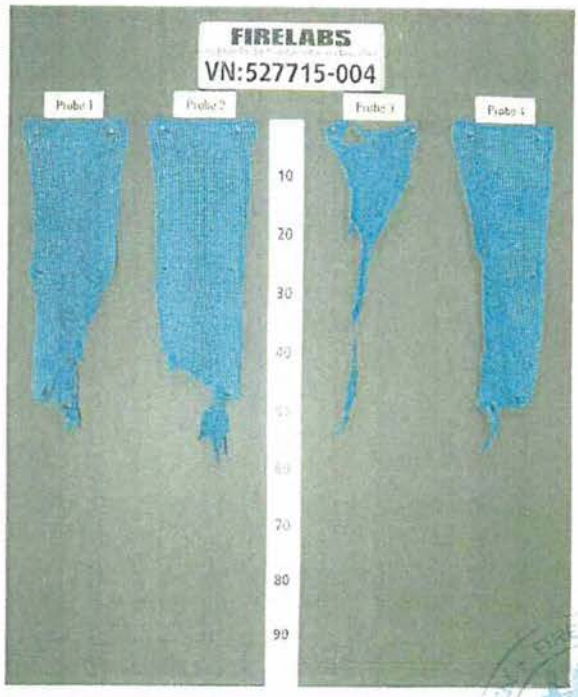

fig. 8
Photo of test specimen after the test

Test specimen E

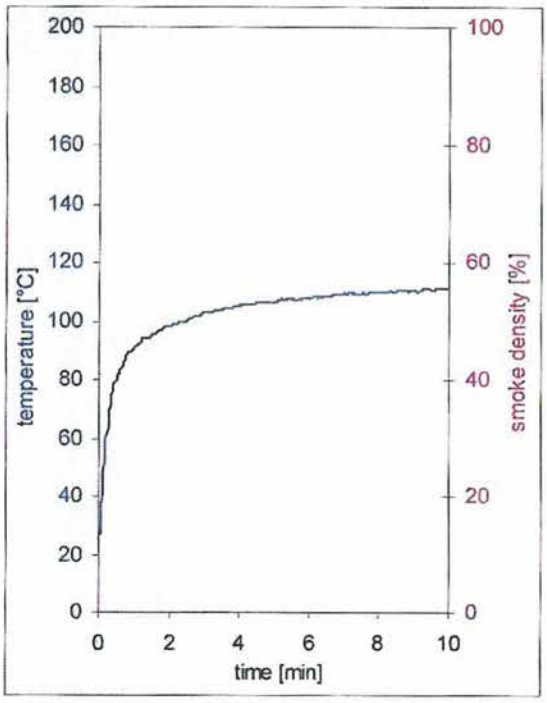

fig. 9
Graphs of the flue gas temperature and the smoke density

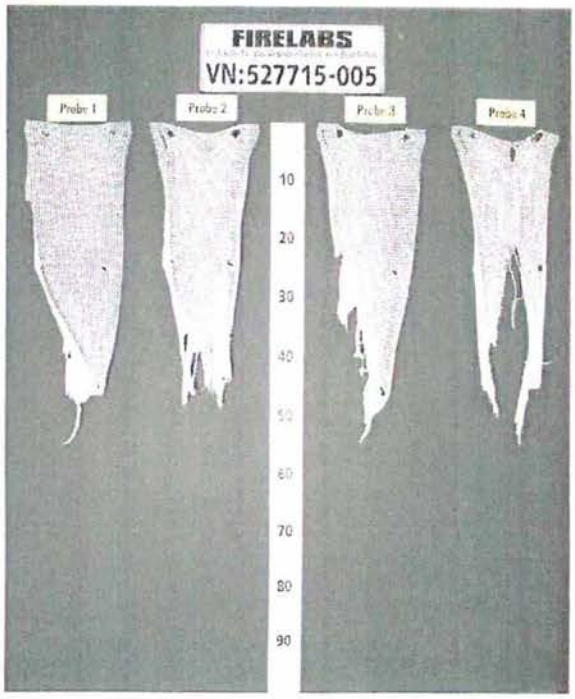

fig. 10
Photo of test specimen after the tes)

Test specimen F

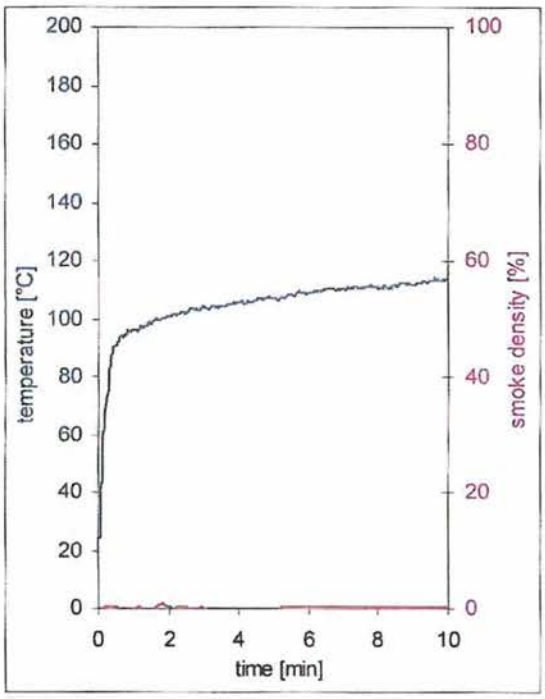

fig. 11
Graphs of the flue gas temperature and the smoke density

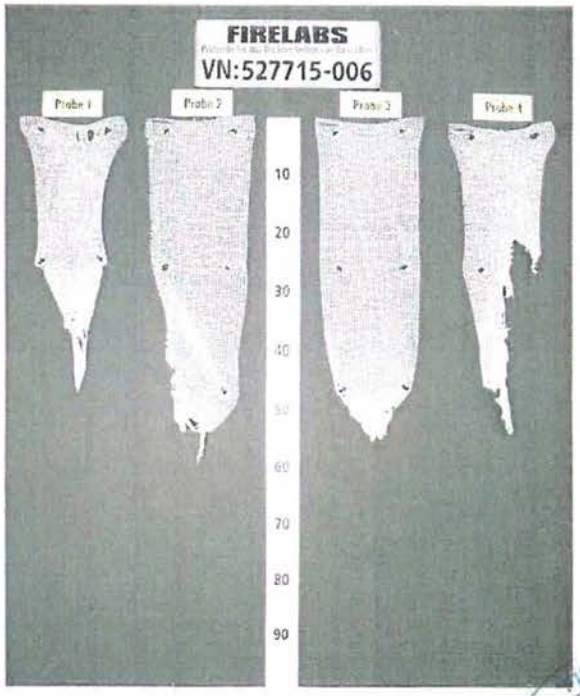

fig. 12
Photo of test specimen after the test

Test specimen G

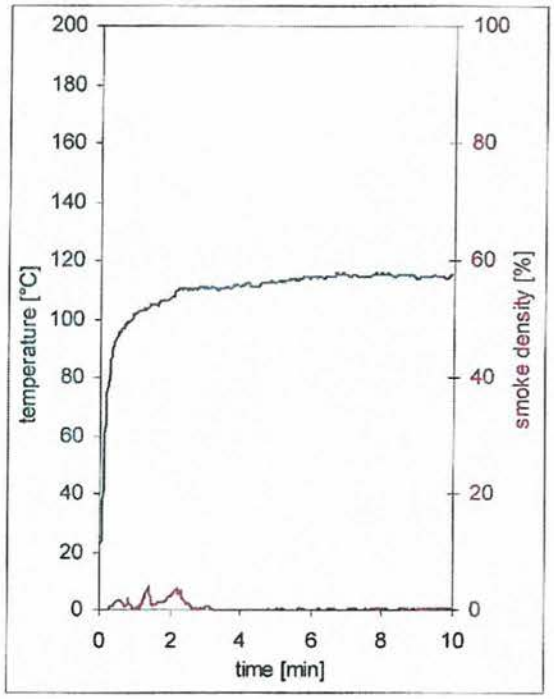

fig. 13
Graphs of the flue gas temperature and the smoke density

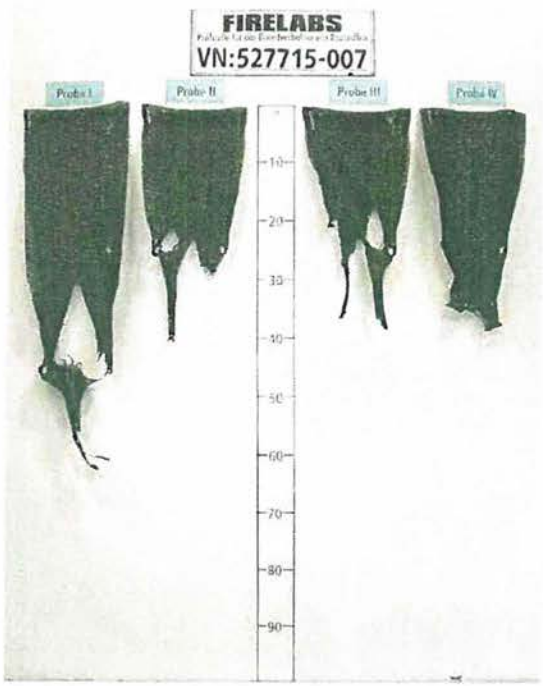

fig. 14
Photo of test specimen after the test

Test specimen H

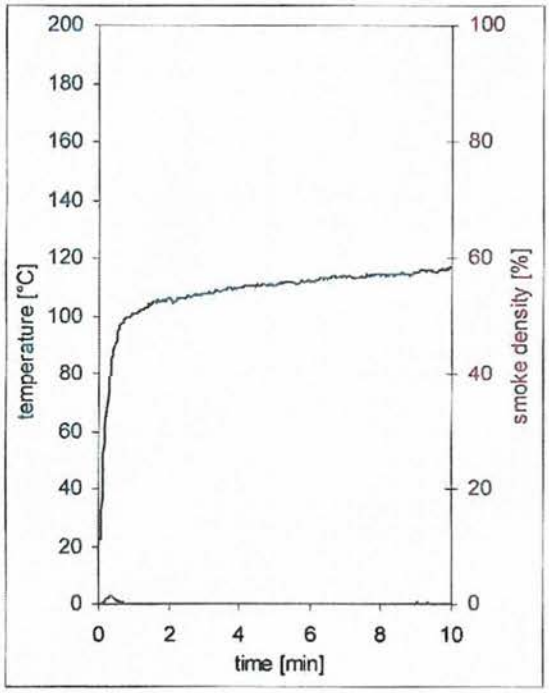

fig. 15
Graphs of the flue gas temperature and the smoke density

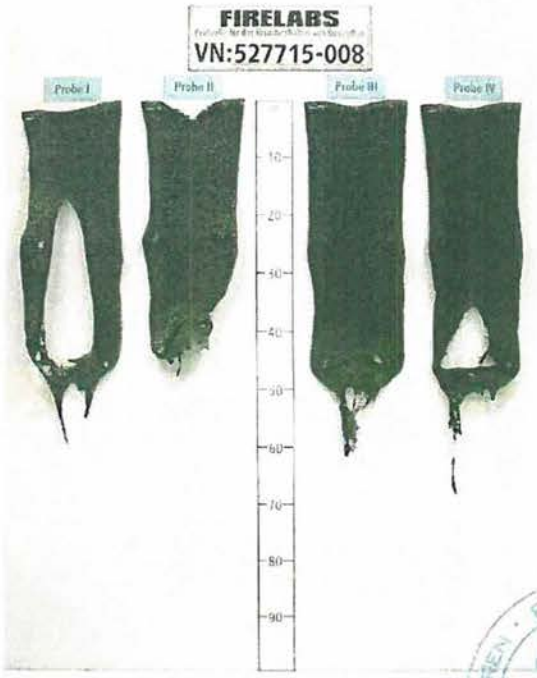

fig. 16
Photo of test specimen after the test

Test specimen I

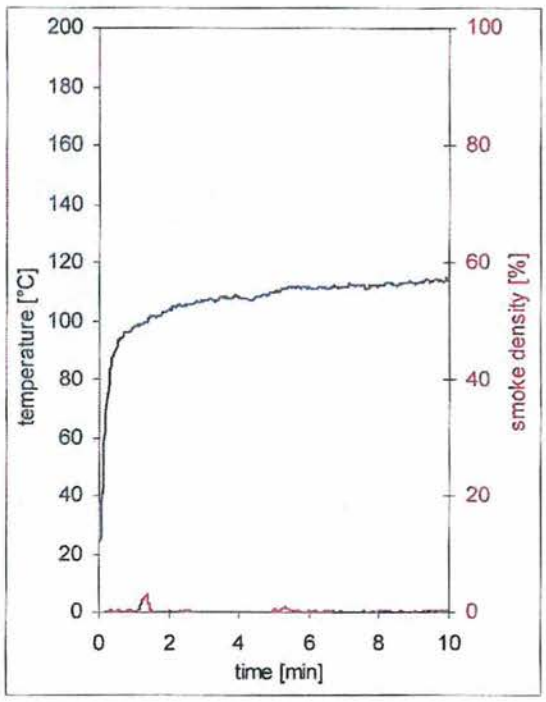

fig. 17
Graphs of the flue gas temperature and the smoke density

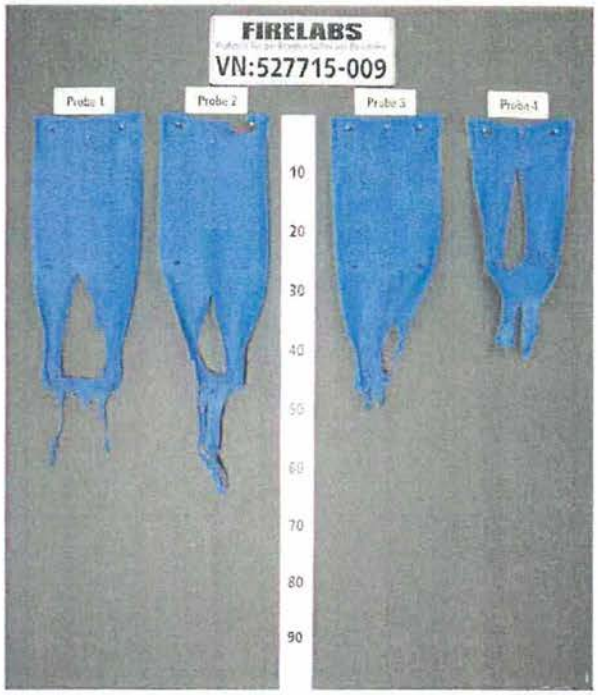

fig. 18
Photo of test specimen after the test

Test specimen K

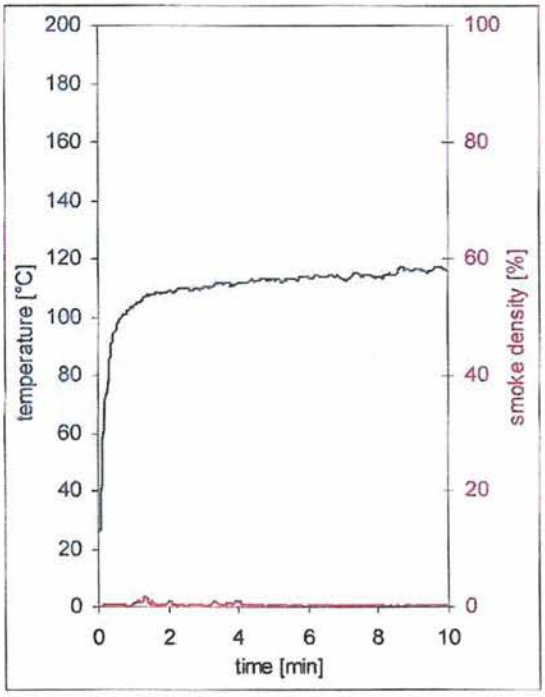

fig. 19
Graphs of the flue gas temperature and the smoke density

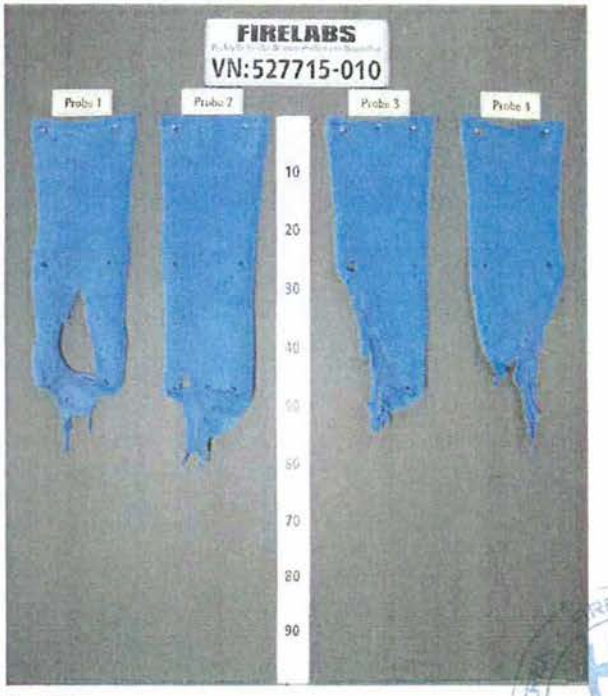

fig. 20
Photo of test specimen after the test

Test specimen L

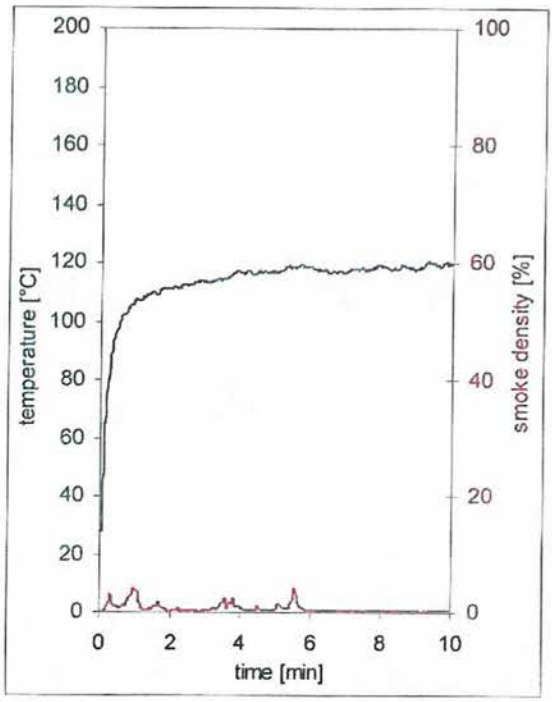

fig. 21
Graphs of the flue gas temperature and the smoke density

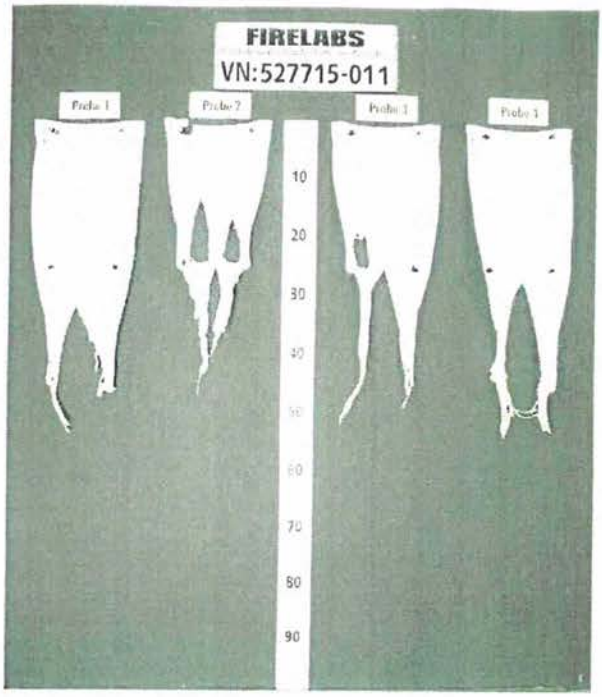

fig. 22
Photo of test specimen after the test

Test specimen M

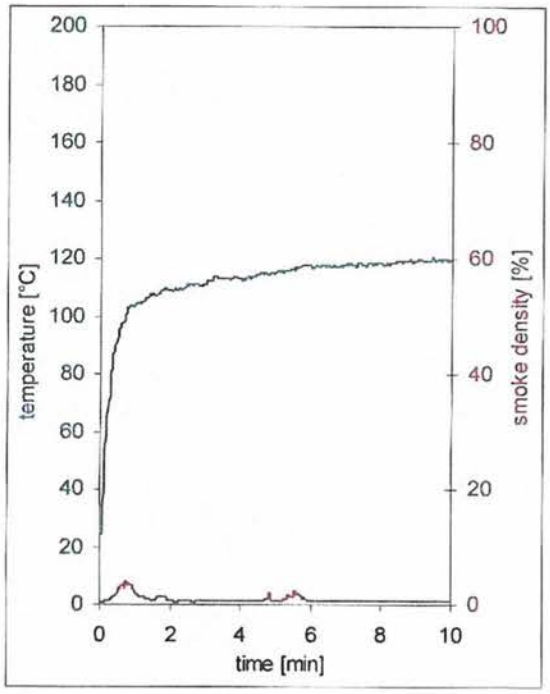

fig. 23
Graphs of the flue gas temperature and the smoke density

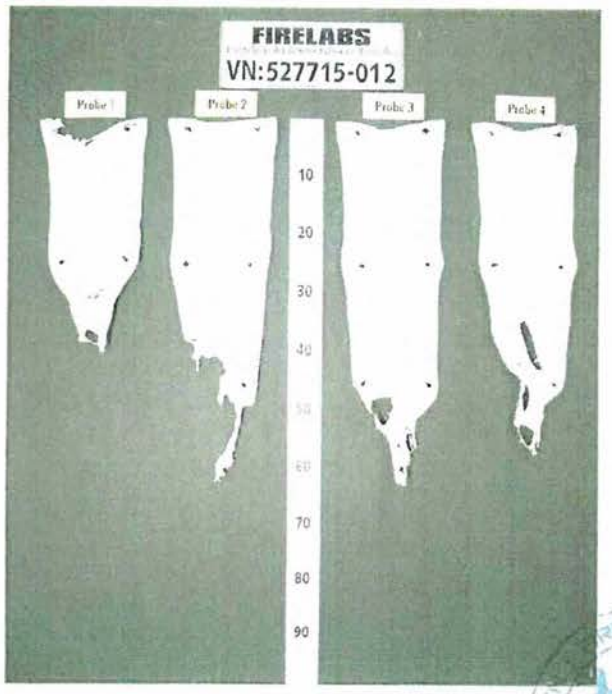

fig. 24
Photo of test specimen after the test

UPM

UPM-Kymmene Wood Oy

Lahti 12.04.2006
Tero Hannonen/KV

CERTIFICATE OF CONFORMITY

DIRECTIVE 95/28/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 24 OCTOBER 1995 RELATING TO THE BURNING BEHAVIOUR OF MATERIALS USED IN THE INTERIOR CONSTRUCTION OF CERTAIN CATEGORIES OF MOTOR VEHICLE

We hereby confirm that UPM-Kymmene Wood has been granted the following type approvals including the trade names meeting the requirements of the above mentioned directive:

Type approval No. e17*95/28*0003*00 and extension No. e17*95/28*95/28*0003*03
Wisa-Birch, Wisa-Combi, Wisa-Combi Mirror, Wisa-Plex, Wisa-Spruce, Wisa-Twin

Type approval No. e17*95/28*0004*00 and extension No. e17*95/28*95/28*0004*03
Wisa-Form, Wisa-Wire, Wisa-Wire F, Wisa-Hexa Grey, Wisa-Hexa Grip, Wisa-SP, Wisa-Trans, Wisa-Bus Floor

Type approval No. e17*95/28*95/28*0008*01
Wisa-Phon N (uncoated, wood faced)

Type approval No. e17*95/28*95/28*0009*01
Wisa-Phon N (phenolic film overlaid)

Type approval No. e17*95/28*95/28*0010*00
Wisa-Van

Methods of affixing the EEC-approval marks are ink spray, stamp, printed coating or sticker on the face of the plywood.

UPM-KYMMENE WOOD OY

Tero Hannonen
Product Manager
Transport Segment

UPM-Kymmene Wood Oy

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VAT No FI1839206-5

CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

PPH Eko-Świat
Kłomice, Poland

has been approved by Lloyd's Register Quality Assurance
to the following Quality Management System Standards:

ISO 9001:2008

The Quality Management System is applicable to:

Casting of aluminium alloys.

Approval
Certificate No:
GDK0003329

Original Approval:	24th April 2001
Current Certificate:	20th May 2010
Certificate Expiry:	19th May 2013

Issued by: Lloyd's Register (Polska) sp. z o.o.
for and on behalf of Lloyd's Register Quality Assurance Limited

UKAS QUALITY MANAGEMENT
001

This document is subject to the provision on the reverse
Lloyd's Register (Polska) sp. z o.o., ul. Marynarki Polskiej 177, 80-958 Gdańsk, KRS 0000117768
This approval is carried out in accordance with the LRQA assessment and certification procedures and monitored by LRQA.
The use of the UKAS Accreditation Mark indicates Accreditation in respect of those activities covered by the Accreditation Certificate Number 001
Macro Revision 13

P.U.H.P. LUMEX Leszek Pióro, Waldemar Pióro
59-700 Bolesławiec, ul. Dolne Młyny 77
tel. 075 / 734 59 40 fax 075 / 734 59 50
www.lumex.com.pl e-mail: lumex@lumex.com.pl

ASSEMBLY INSTRUCTION

FOR MOBILE STAGE

Scene's dimensions: 8,0 m x 6,0 m, h = 5,30 m
Type of roof: profiled
Type of roof lifting: rope hoists system

The stage platform consists of a floor and folding side panels. The floor is made of plywood waterproof anti-slip thickness 18mm. Roofing construction is made of the central part lifted upwards and the two wings of the roof. Roof cover is made of PVC material with a weight 650 g/m^2.

UNFOLDING DESCRIPTION

The flat and best hardened areas should be chosen for the platform layout.

1. Carry the trailer (stage) to the selected location, detach from the towing vehicle and apply the parking brake.

2. Level the trailer – by use four pillars located underneath the trailer at the front and the back.

3. Spreading the stage platform consists of lowering the sides on both sides of the trailer.

-Lower the sides of the board evenly with the two hoists placed at both ends of the board,
-after lovering the sideboard should be leveled by screws mounted on the sideboard to form flat floor with trailer,
-lovering of right side is similarly the same as lovering left side.

4. Lifting of the roof :
   -detach the front and rear tarpaulin,
   -spread apart the roof construction and mount beams under tarpaulin,
   -begin lifting the roof with a lifting system using rope hoists,
   -raise evenly to the point where roof's secure is available,
   -Secure the raised roof structure with the spring locks located at the four corners of the trailer at half the height of the side.

5. Connect the corners of the platform (sideboard's corners) with the corners of roof wings by use construction QUADRO – set the QUADRO truss with a hook pointing upwards, perpendicular to the sideboard line, insert hook of BISYSTEM truss to the socket in the corner of roof wing and rotate 90 degrees, then lower part of truss should be mounted in the socket in platform's corner and secure with screws m 8x60 with butterfly nuts.

6. Secure the trailer with four exhaust belts, from each corner of the trailer on one belt - insert the belt handle into the corner profile, attach one end of the safety belt to the eye of the handle, subsequently Attach the other end of the belt to the steel anchor bolted to the ground. After installing the belts must be tensioned.

7. The next step is safety barriers installation. For this purpose, at the rear of the stage are provided handles for assembly. Slide the barriers into the bumper.

8. The assembly of the stairs consists in sliding into the hitches existing at the stairs to sleeves attached to the right side of the stage and leveling with threaded feet.

9. To the stage so prepared should be installed rear and side curtain by use elastic straps with hook, hooking them to the roof tube and the vertical elements in the corners of the scene (BISYSTEM).

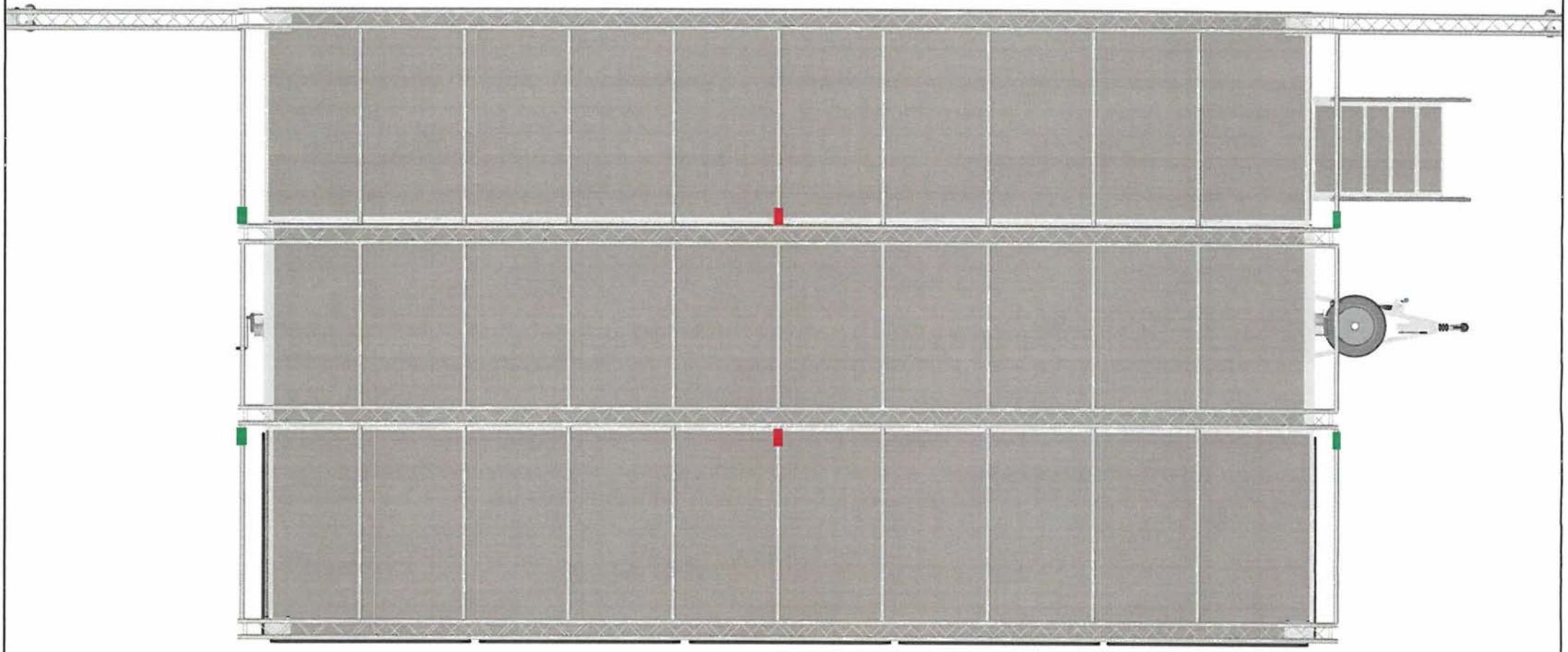
10. There is a possibility of achieving a higher total altitude of the mobile stage and height of a scene after applying appropriate ramps, allowing for the desired height.

DISASSEMBLY OF THE MOBILE STAGE IS IN THE REVERSE ORDER TO ASSEMBLY.

Mobile stage 8,0m x 6,0m with PA wings

Loadings

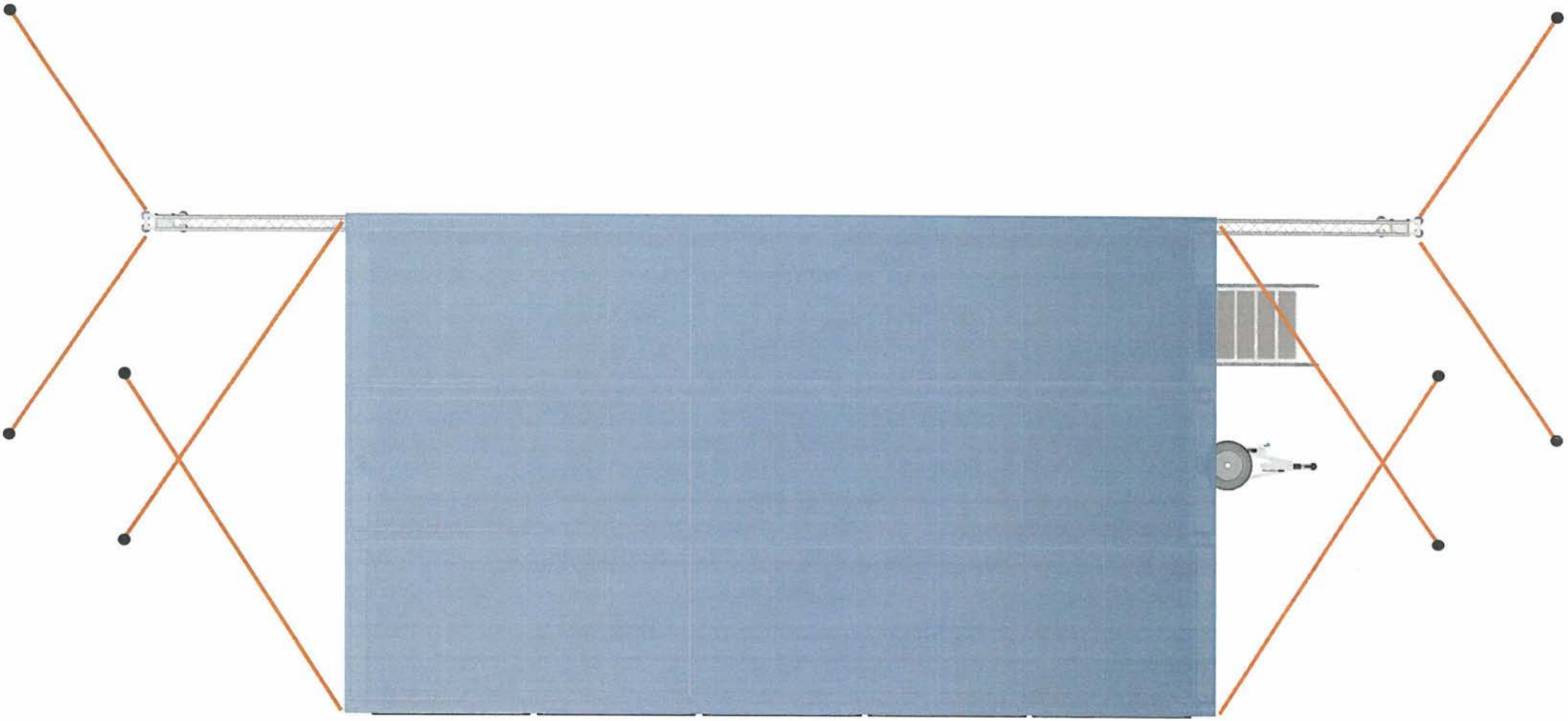
LUMEX
ul. Dolne Młyny 77 59-700 Bolesławiec
tel. +48 75 734 59 40 fax +48 75 734 59 50
www.lumex.com.pl e-mail: lumex@lumex.com.pl



Mobile stage 8,0m x 6,0m with PA wings

Roof support profile

LUMEX
ul. Dolne Młyny 77 59-700 Bolesławiec
tel. +48 75 734 59 40 fax +48 75 734 59 50
www.lumex.com.pl e-mail: lumex@lumex.com.pl



Mobile stage 8,0m x 6,0m
with PA wings

Stay belts with anchors

LUMEX
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tel. +48 75 734 59 40 fax +48 75 734 59 50
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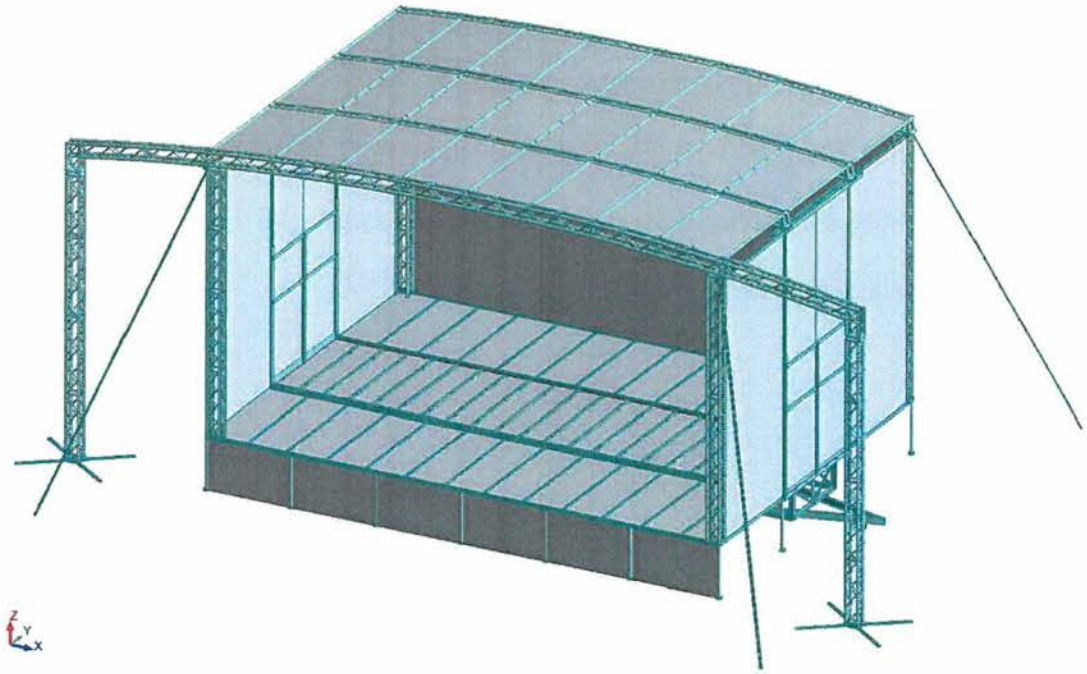
MCE Sp. z o.o.
50-037 Wrocław, ul. Kościuszki 15/1

STATIC AND STRENGTH CALCULATIONS



OBJECT:
8x6m profiled mobile stage
ORDERING PARTY:
PUHP LUMEX **Ul. Dolny Młyn 77** **59-700 Bolesławiec**

WROCŁAW, MAJ 2014

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IV. LOADS

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VII. VERIFICATION OF CONSTRUCTION DISLOCATIONS

VIII. CONCLUSIONS AND FINAL REMARKS

Appendix Z-1 Tables of aluminum element strength (optional)

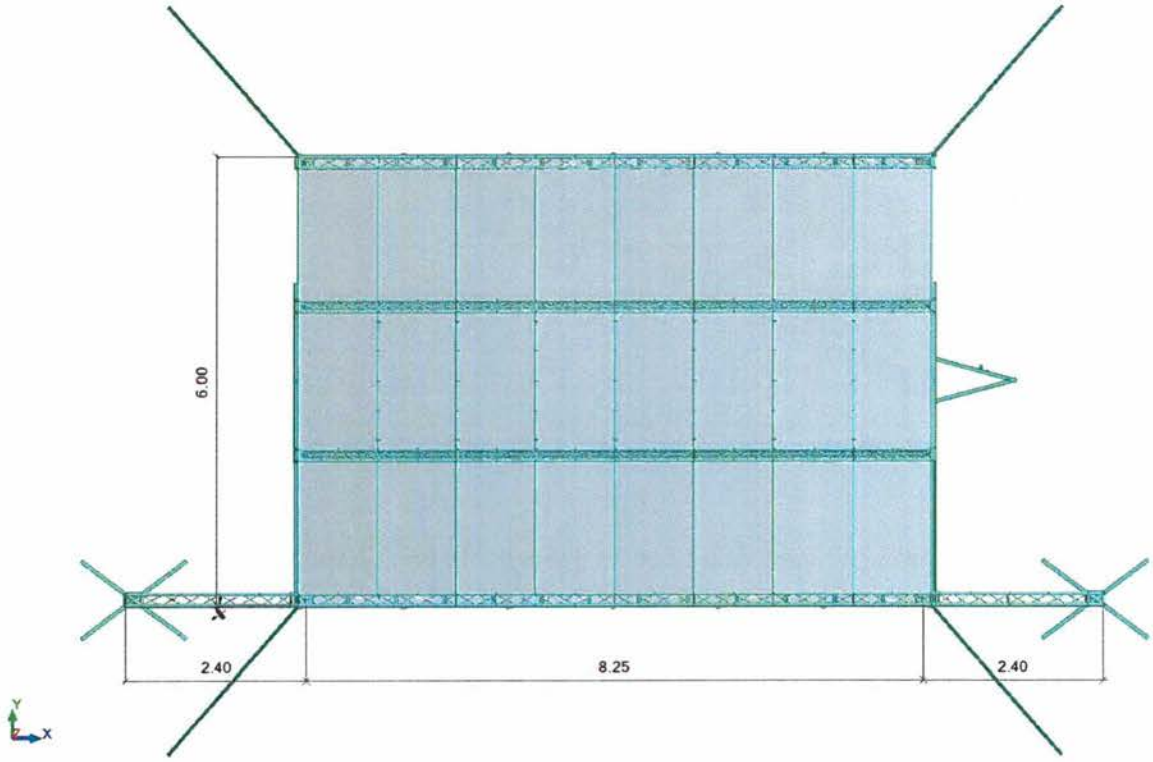
Appendix Z-2 Tables of steel element strength (optional)

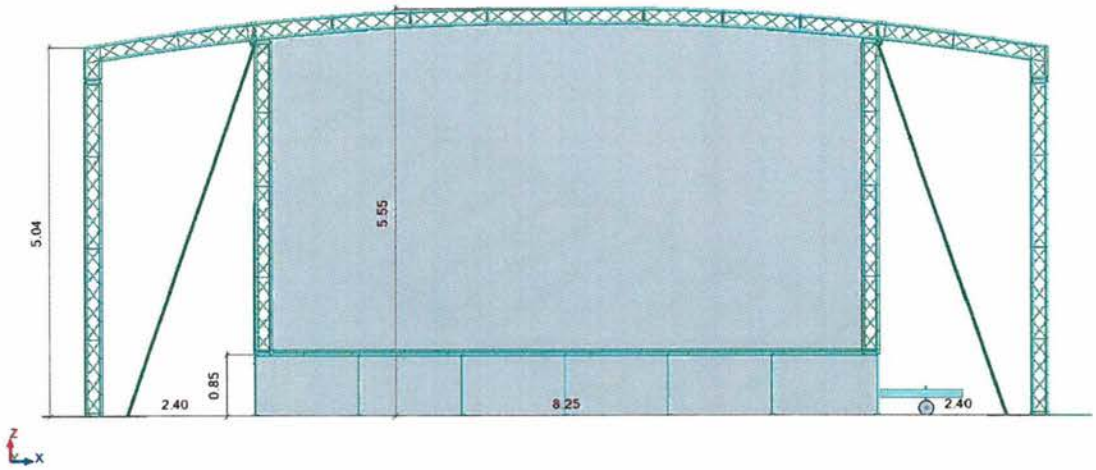
Appendix Z-3 Allowable stage loads [kg] (optional)

I. SCOPE OF DOCUMENT

The aim of this document is to prepare a calculation model according to manufacturer's guidelines and to check load-bearing capacity of structural elements. It is possible to present additional guidelines with respect to use of an object

The subject of this document is a profiled mobile stage. Stage dimensions 8x6 cm, height approximately 5, 5m.

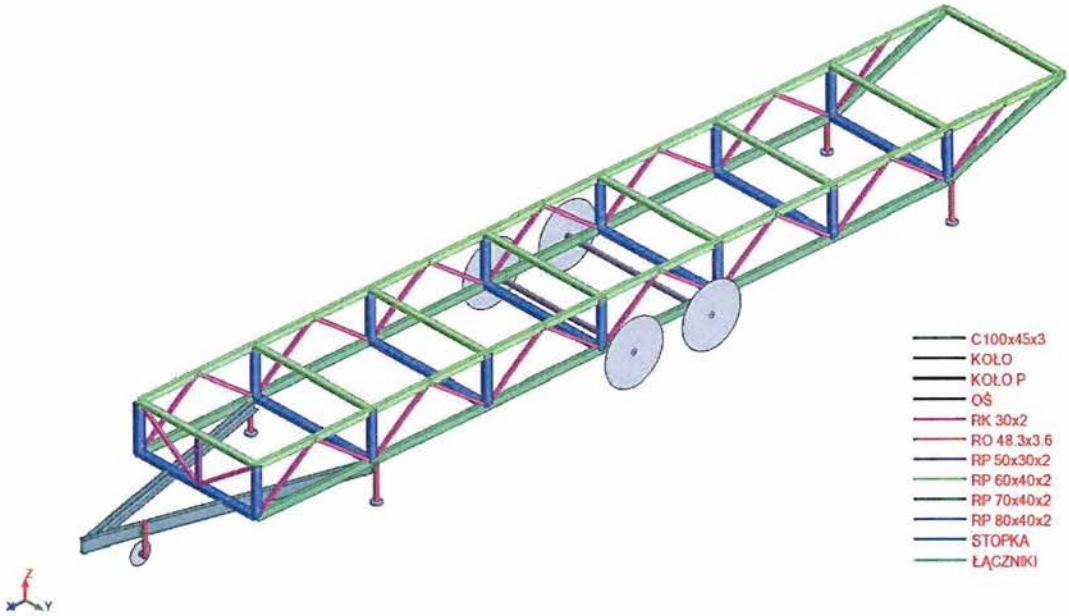




II. STRUCTURE CHARACTERISTICS

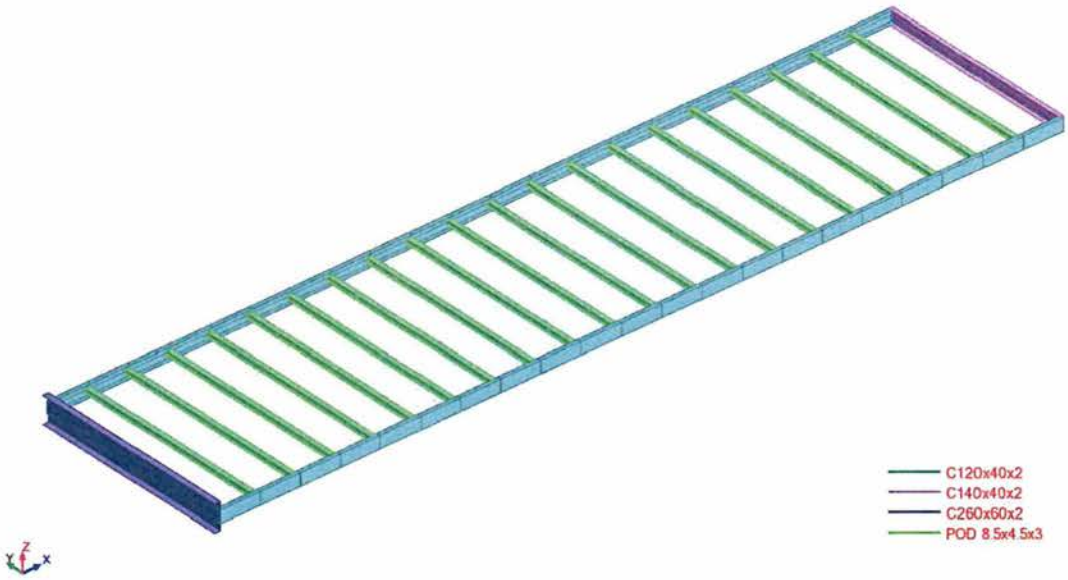
The whole structure can be divided into a few basic parts.

1. **Steel frame of undercarriage,** which is mainly made of rectangular pipes welded in the form of a spatial truss:

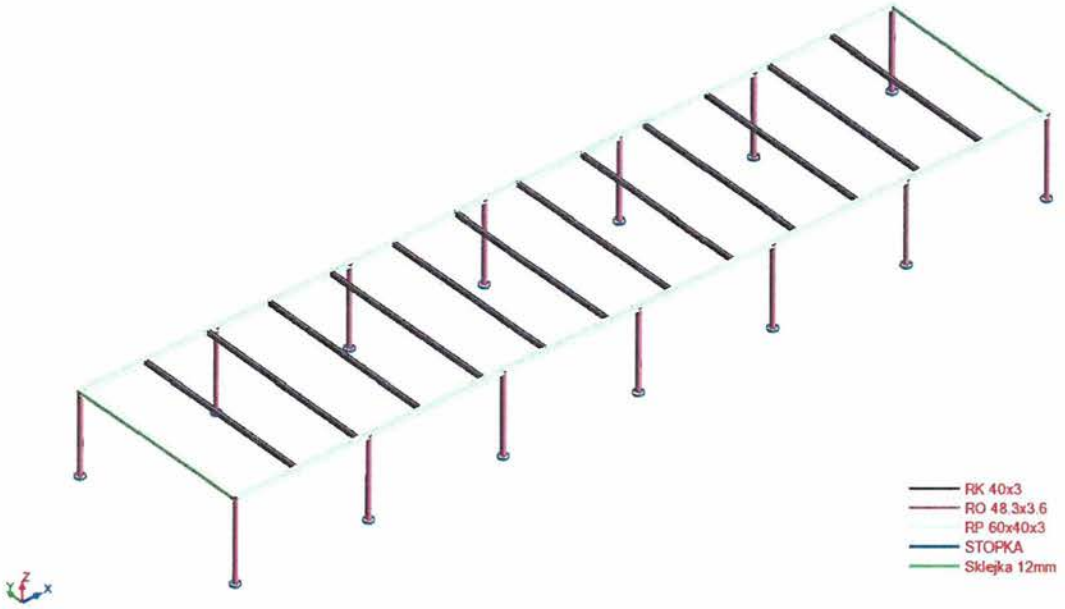


2. **Steel platform grillages, which can be divided into two types.**

First one permanently affixed to the main frame, made of rectangular pipes and bent sheet metal cross sections. Platform covering is a plywood 20 mm thick.



The second one consists of two side grillages connected with the elevated platform by means of hinges. These platforms are made of square and rectangular pipes. Platforms are supported by rectangular pipes. Roofing is a 12mm thick plywood.

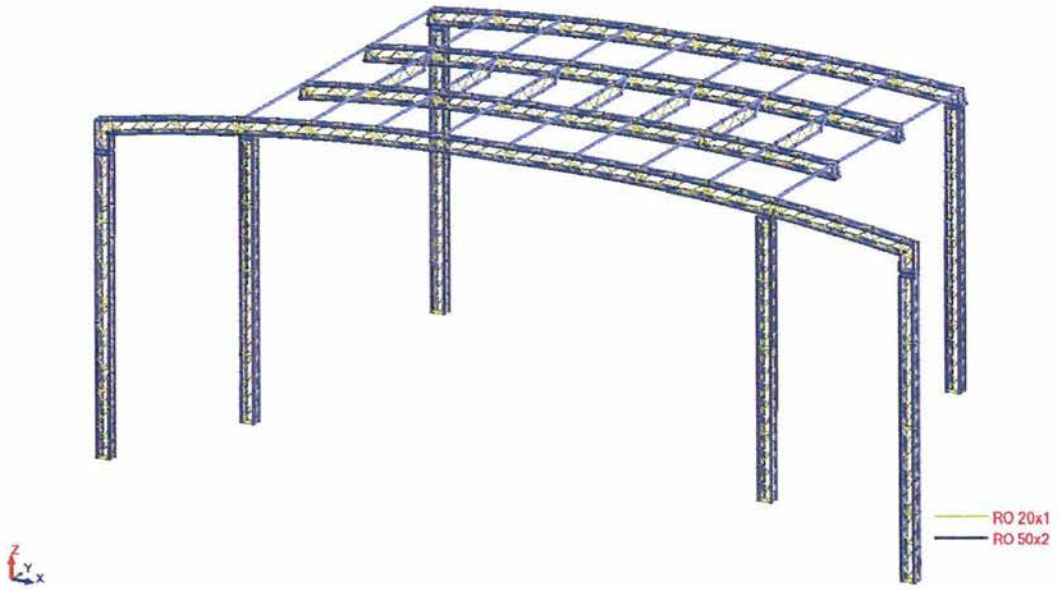


3. **Steel supporting sliding structure under aluminum canopy enclosure**

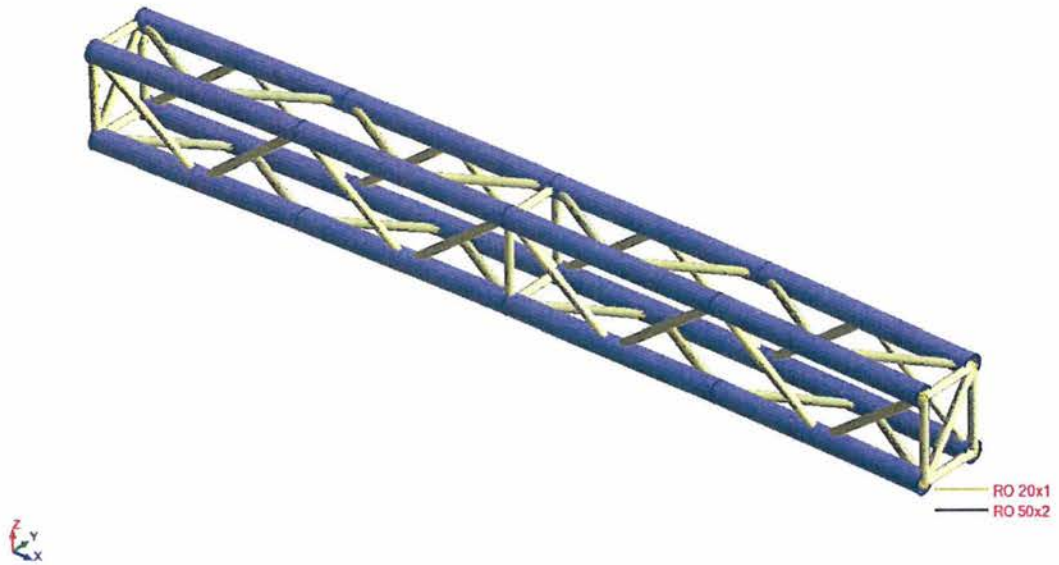
Fixed to edge beams of central elevated platform. Made in the form of a steel frame built from rectangular pipes. Vertical lifting by means of hydraulic actuator and two sliding pipes. Vertical sliding by means of pipes where inner pipe slide into its corresponding outer pipe.

4.Aluminium stage enclosure

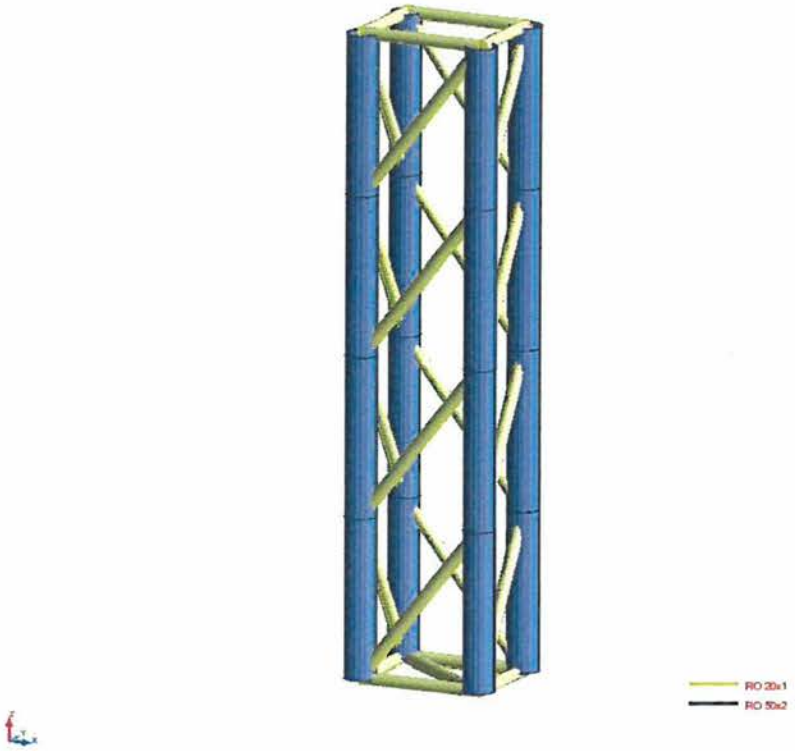
Main structure elements are four main beams made in the form of 40 cm curves and spacing approximately 1, 8 m. Curves rest against supportive steel structure. Edge beams additionally supported by aluminum columns. Roof construction supplemented by tie-beam in the form of pipes (end spans) or trusses. In the front part, support structure provided for the speakers in the form of curve extension approximately 2, 3 m and by introducing additional columns.



Curves made in elements QUADRO 250/200/2,0

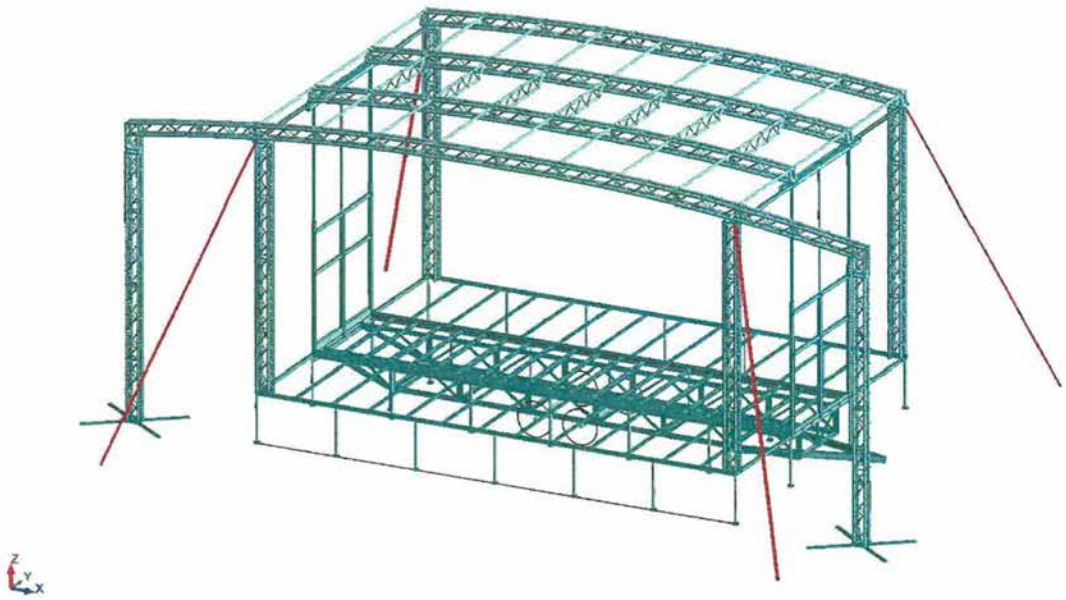


Columns also made in the form of elements. QUADRO 250/200/2,0



4. Stiffening elements

Stiffening consists of four belts fixed to points of extreme columns. Modelled as steel stripes.



III. CALCULATION MODEL OBJECTIVES

Structure elements modelled according to documentation provided and based on measurements carried out; connections of some elements made with the aid of additional elements (so called fasteners), which are to imitate the structure's work to the fullest extent. Element connections modelled as flexible (dependent on rigidity of connected elements. Elevated platform columns are pin jointed with substrate. Aluminum column base connections with substrate modelled as pin connections (rigid connection provides support spacing)

All steel elements modelled of steel S275

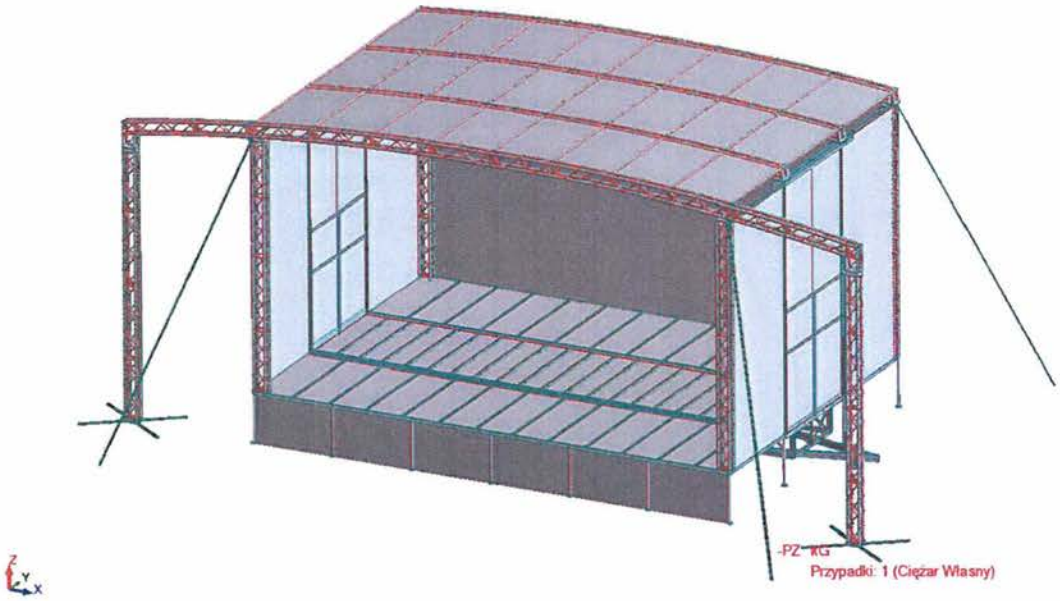
All aluminum elements modelled of aluminum SEPA6063 of chararacteristic compressive strength 170 MPa, Young's Models E=700000MPa and weight 27Kn.m3

Enclosure designed in the form of claddings, which spread the load on particular structure elements. Claddings do not have their own weights.

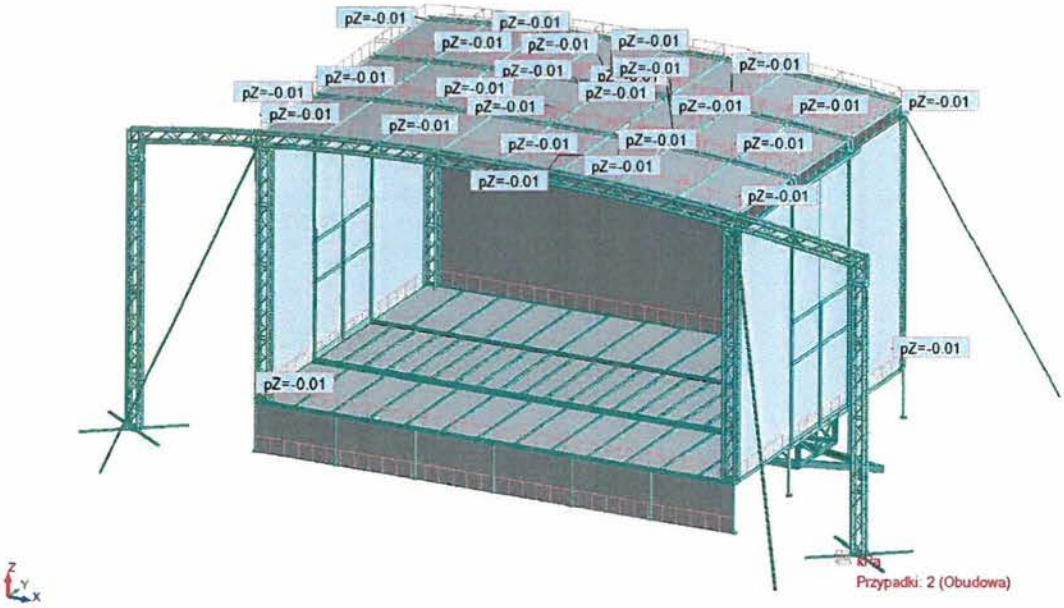
IV. LOADS

Due to temporary status of the structure and guidelines resulting from the object's use, the following loading configurations have been determined

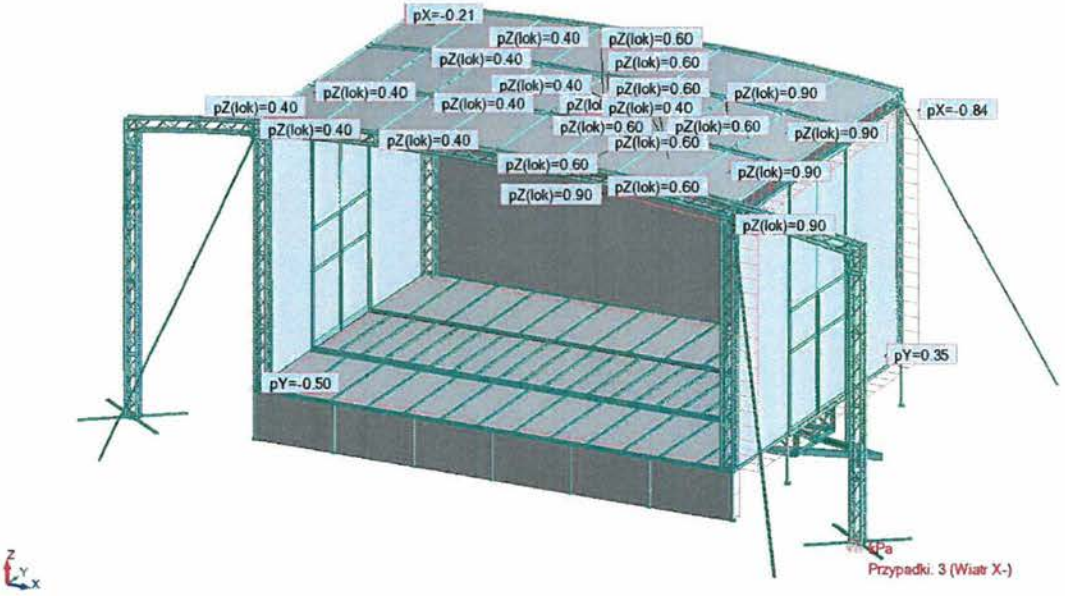
1. Dead load- results from element sections and it is automatically considered

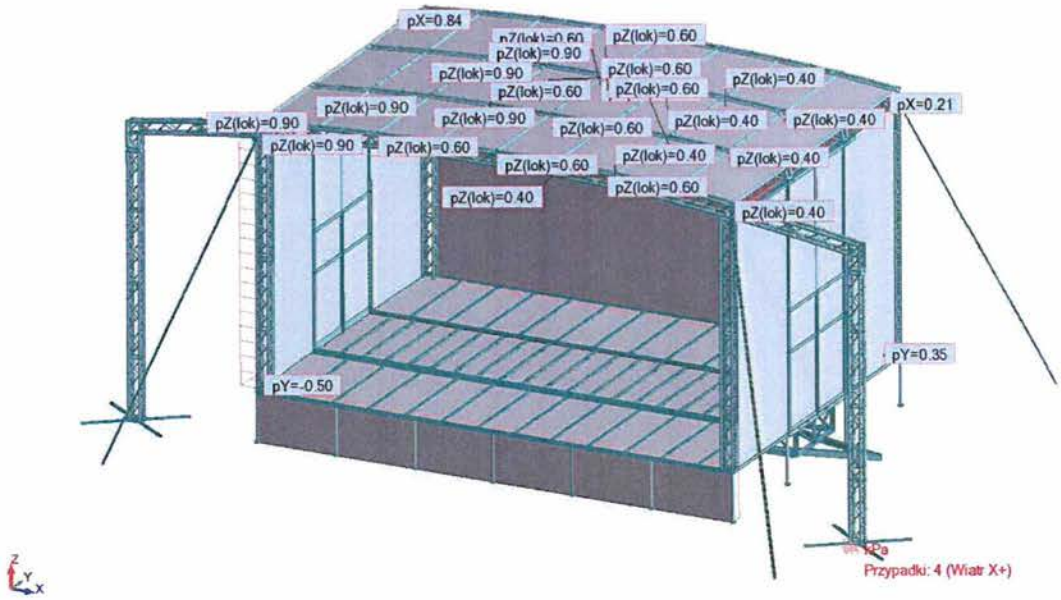


2. Tarpaulin load- maximum load of tarpaulin 12kg/ m2(0,1 Kn/m2)



3. Wind load – 4 diagrams were accepted depending on wind's directions. Due to structure nature, it was assumed that maximum wind's speed is 70 km/h, side walls permeability accepted on the level of 30%. Aerodynamic coefficient accepted in accordance with PN-77/B-02011 as the difference of internal and external pressure (WARNING: one must multiply values from the charts by 0, 30)

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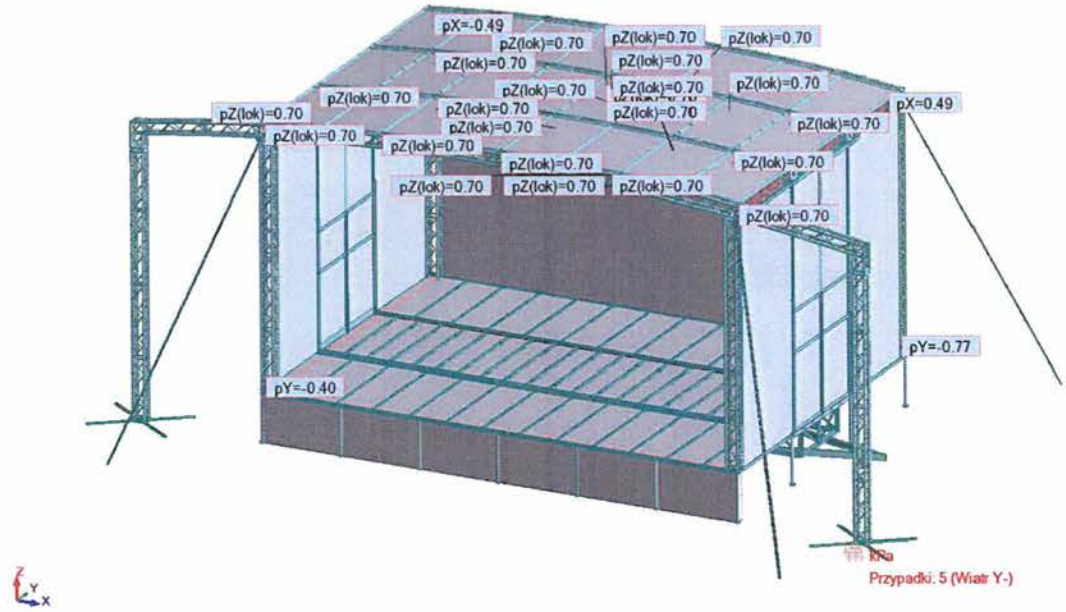
pY=0.35
pY=-0.50
Przypadki: 4 (Wiatr X+)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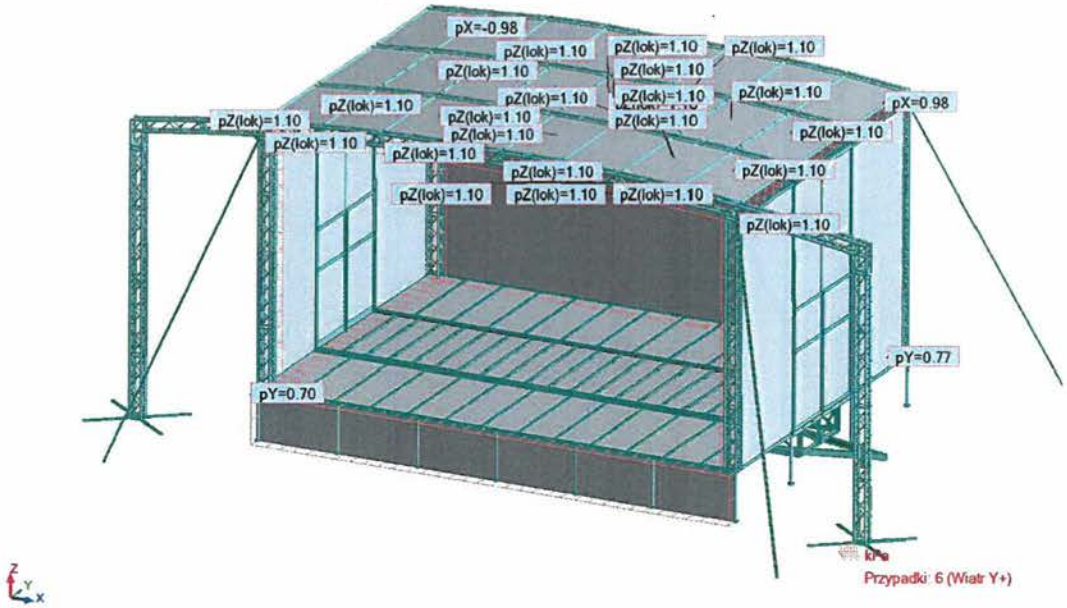
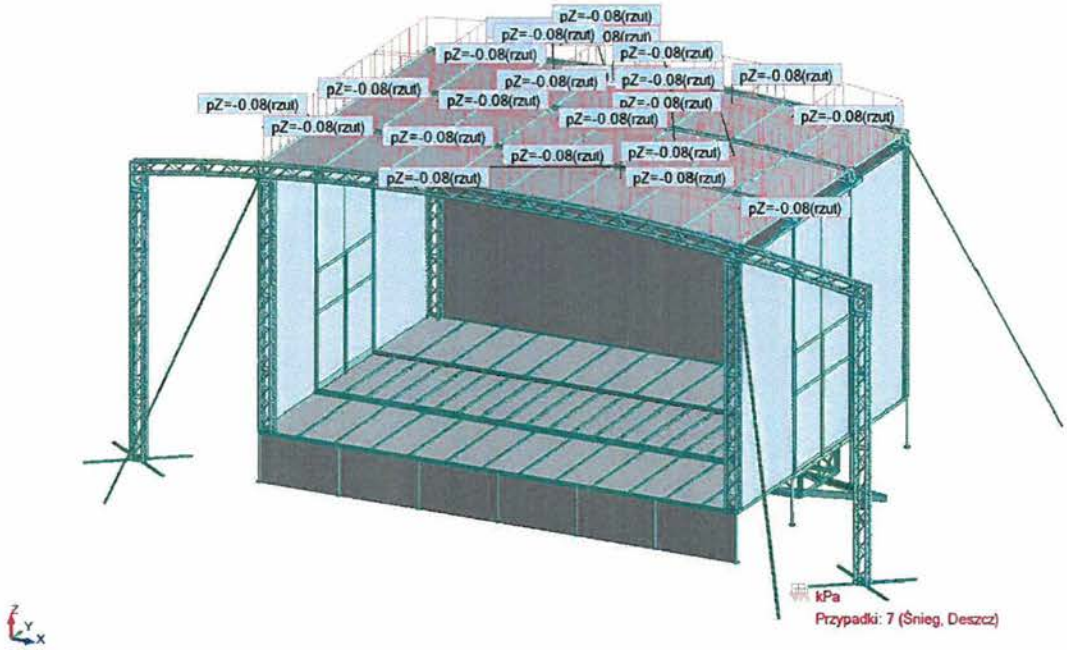
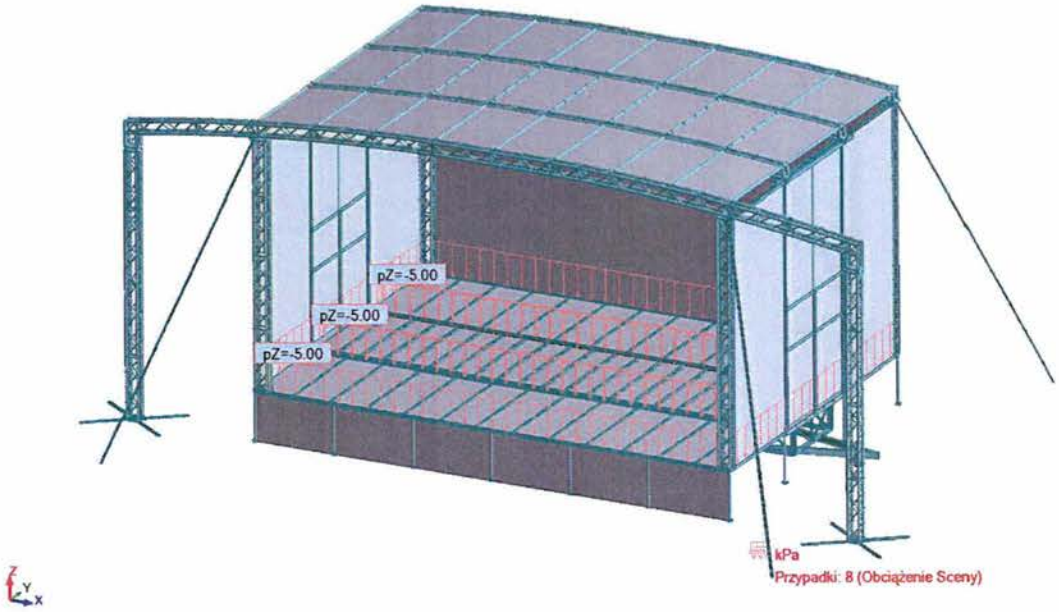


4. Snow load is not taken into consideration, one allows the rainfall occurrences, during which water accumulating on the top will not exceed 8kg/m2(8 mm, 08Kn/m2)



5. Technological load- loads suspended under sound and lightning structure. These loads are divided into three calculations schemes. Over the whole surface of the stages load 500 kg/m2 (5Kn/m2) was planned- scheme 8. Accepted 300 kg (3Kn) load on end spans and 500 kg (5Kn) on central spans and 50 kg (0, 5 Kn) on central columns- scheme 9. Additionally, 800 (8Kn) load was put on additional spans(side ones)- scheme 10.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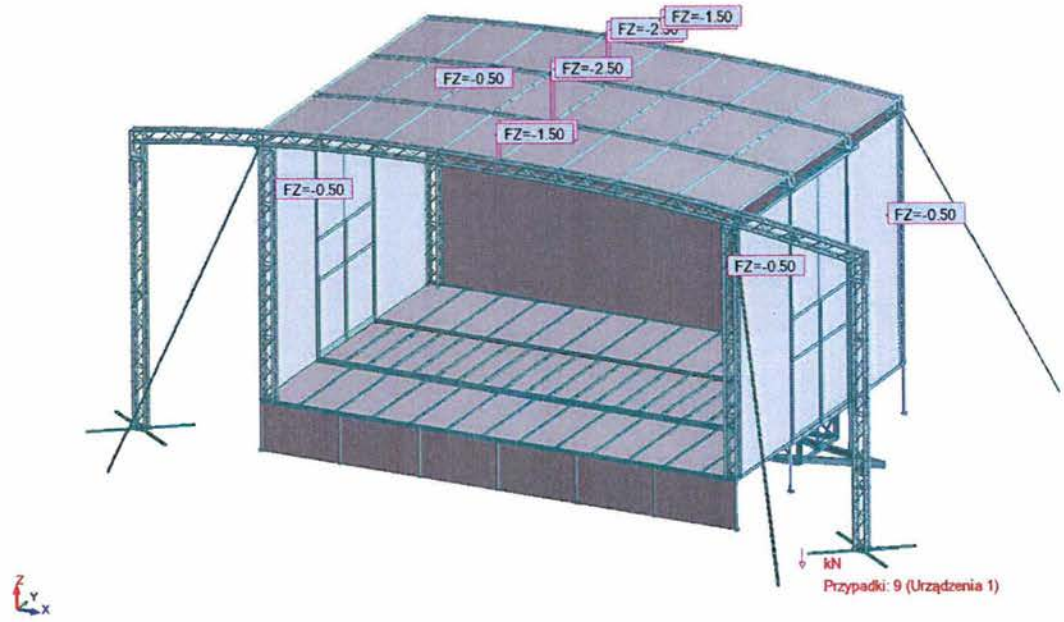
kPa
Przypadki: 8 (Obciążenie Sceny)


FZ=-1.50
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kN
Przypadki: 9 (Urządzenia 1)

Load arrangements made based on EN 1990-2002, load coefficients are 1, 35 (constant) and 1, 50 (variable)

Parameters of standard arrangement making

Type of standard arrangements: complete

List of active cases

1: Dead load	*constant*	*G1*
2: Support	*stałe*	*G2*
4: Wind X+	*wind*	*W1*
3: Wind X-	*wind*	*W1*
5: WindY-	*wind*	*W1*
6: Wind Y+	*wind*	*W1*
7: Snow, rain	*snow*	*S1*
8: Stage load	*Live1*	*Q1*
9: Equipment 1	*Live1*	*Q1*
10: Equipment 2	*Live1*	*Q1*

List of arrangement patterns

SGN	*standard*	
SGU	*frequent*	
List of defined groups		
constant:	*G1*	*and,*
	G2	*and,*
operational:	*Q1*	*or,*
wind:	*W1*	*or,*
snow:	*S1*	*or,*

List of defined relations

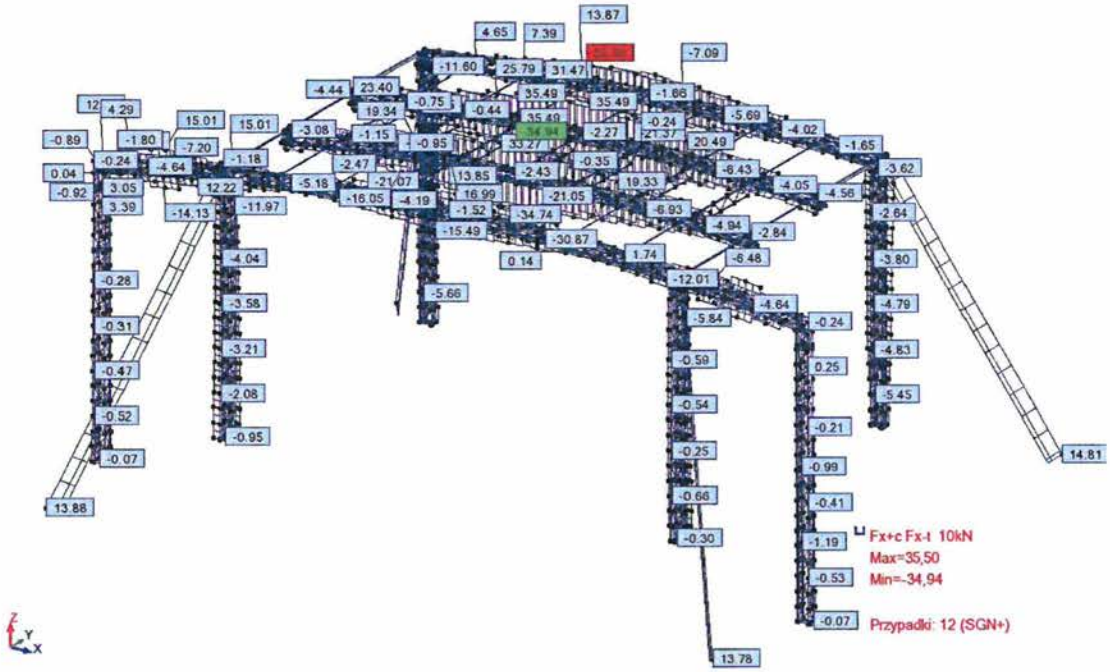
constant:	*G1 i G2*
operational:	*Q1*
wind:	*W1*
snow:	*S1*

V. STATIC CALCULATIONS

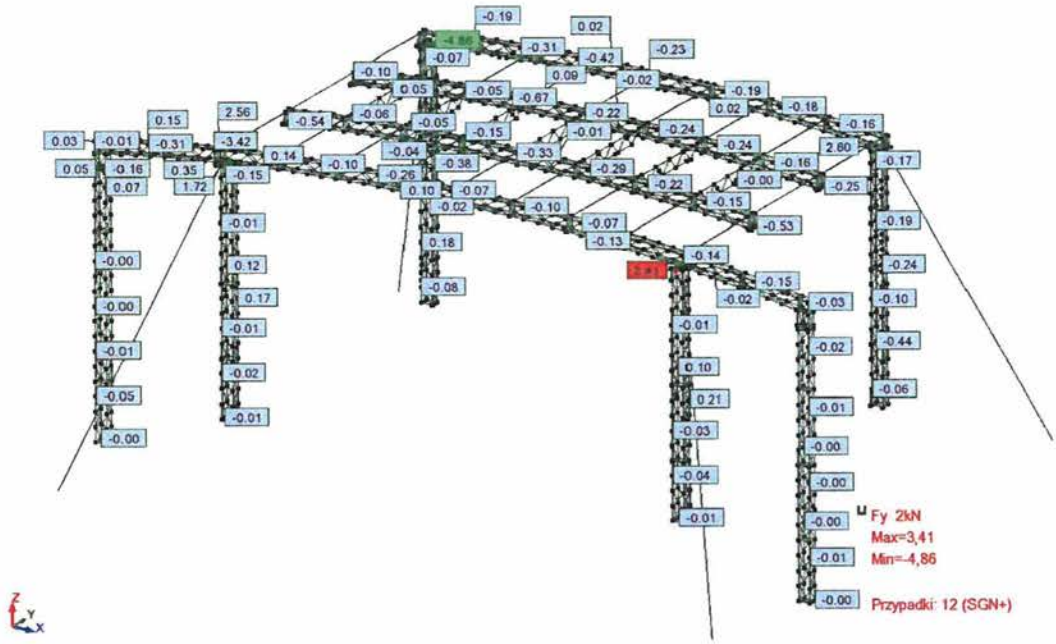
Static calculations made by ROBOT MILLENIUM program. Based on calculation model, boundary diagrams of external forces of displacements and reaction was obtained.

External forces for aluminum structure + tie bags.

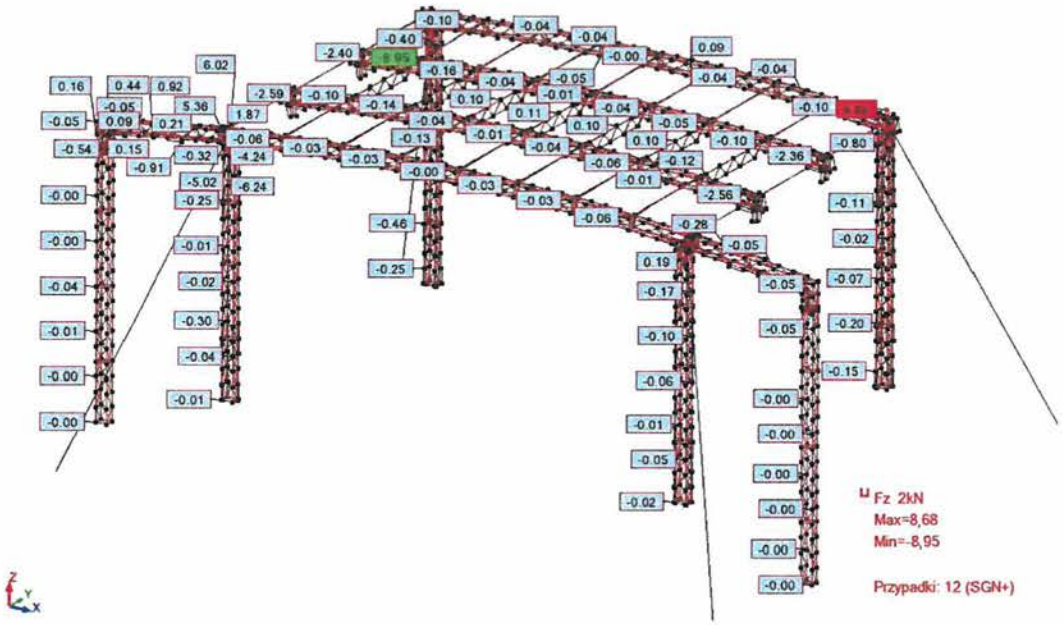
Axial strengths Fx (SGN):



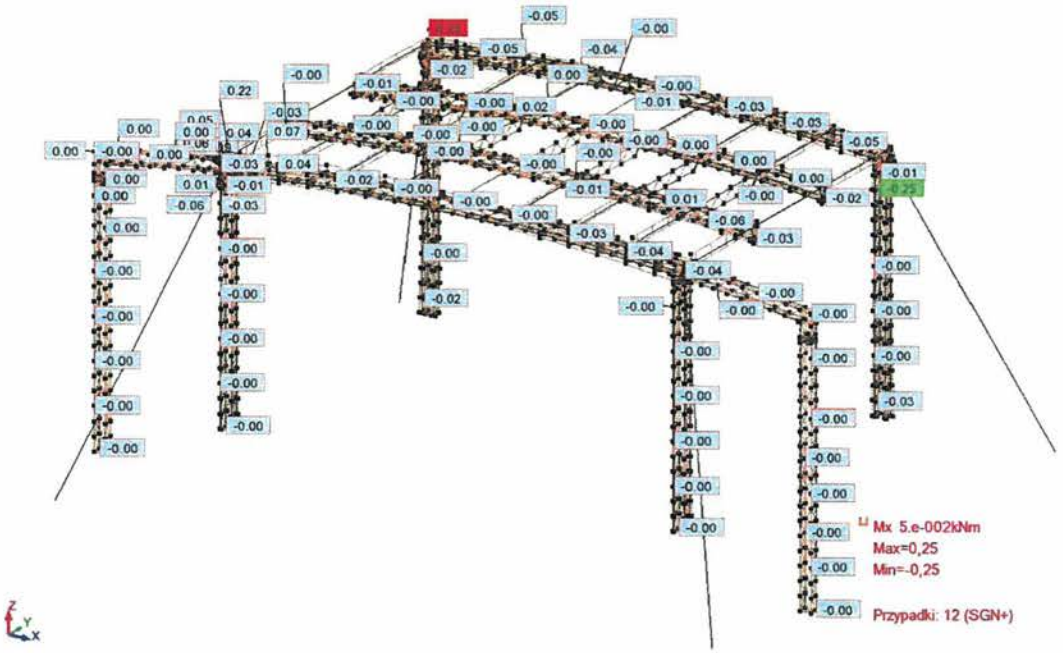
Shear forces Fy (SGN):



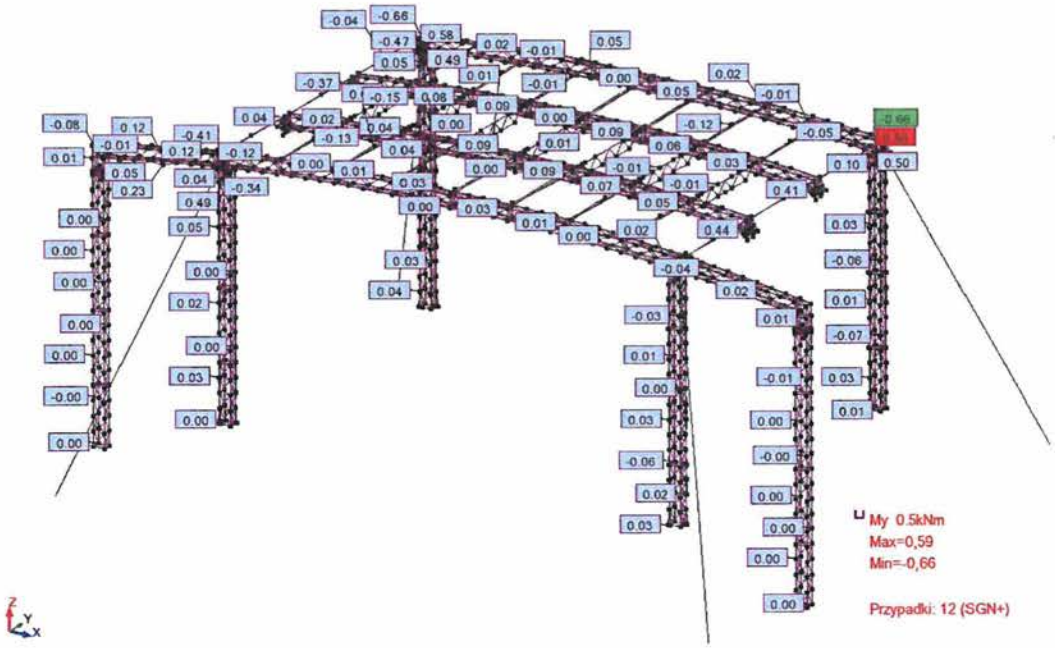
Shear forces Fz (SGN):



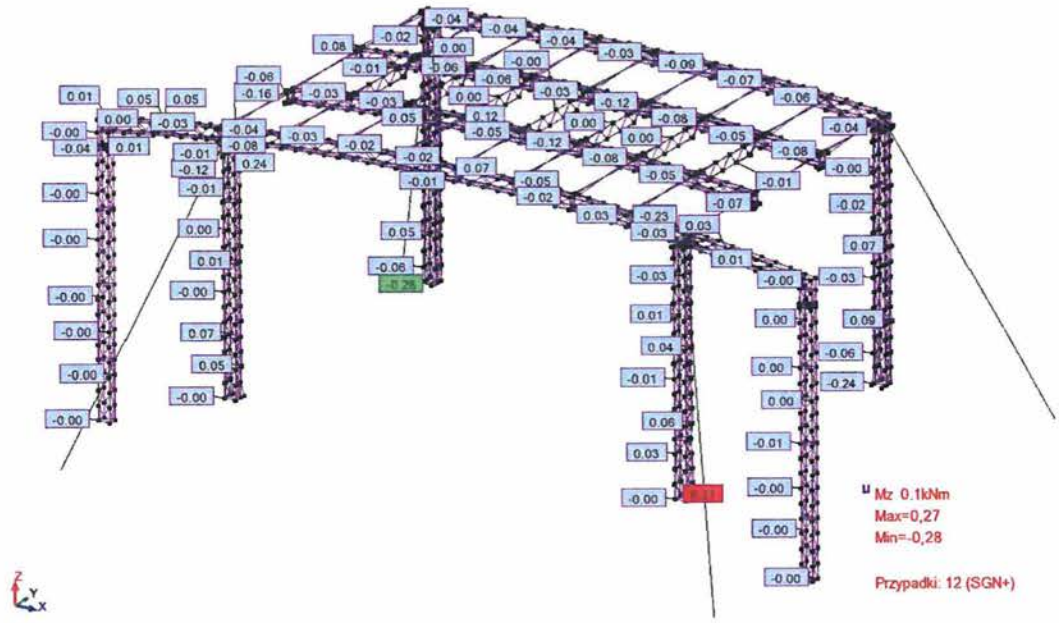
Torsion moment Mx (SGN):



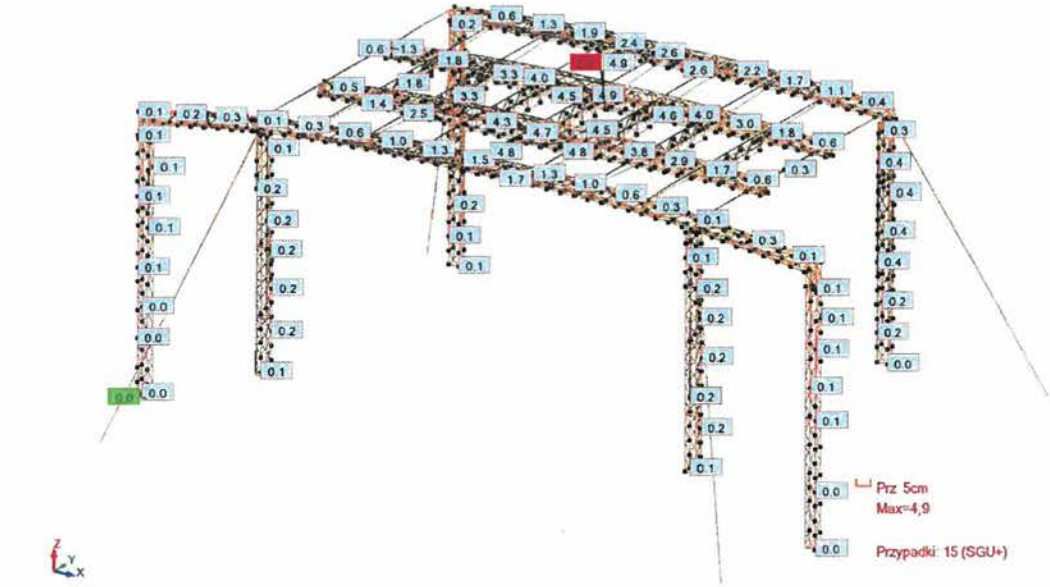
Bending moment My (SGN):

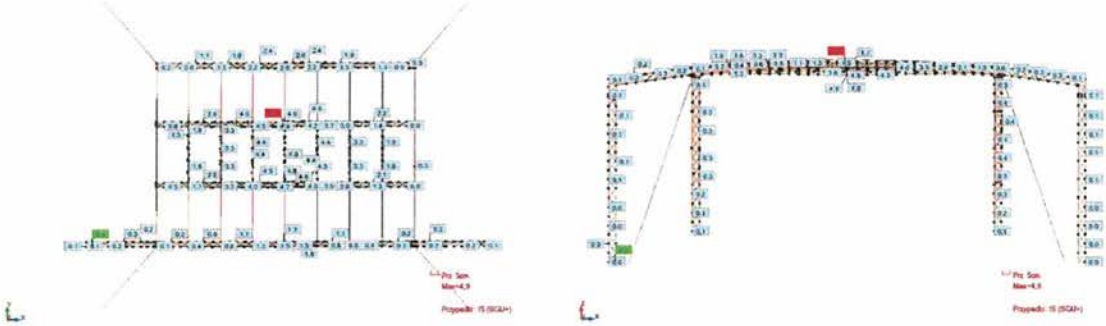


Bending moment Mz (SGN):

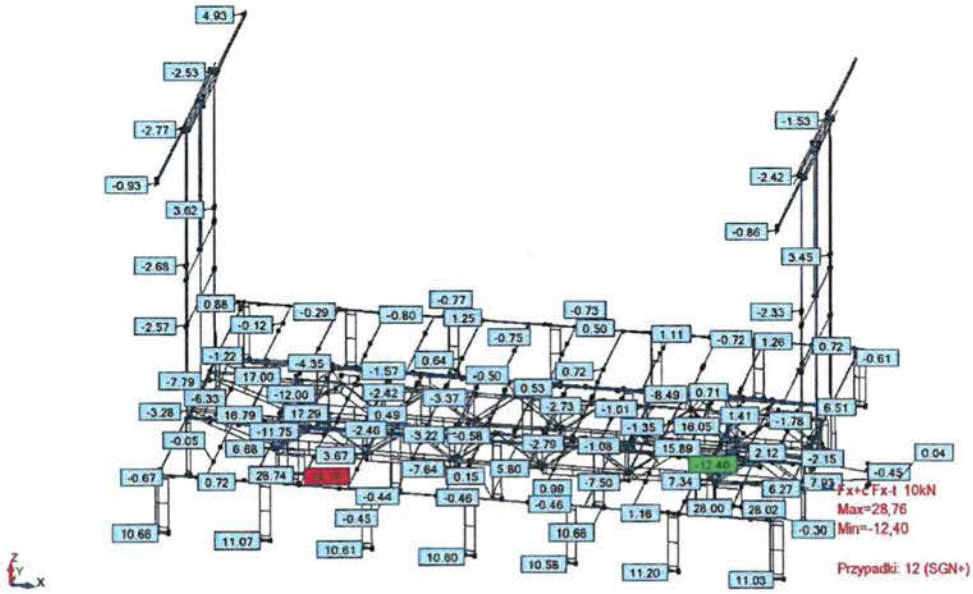


Displacements (SGU):

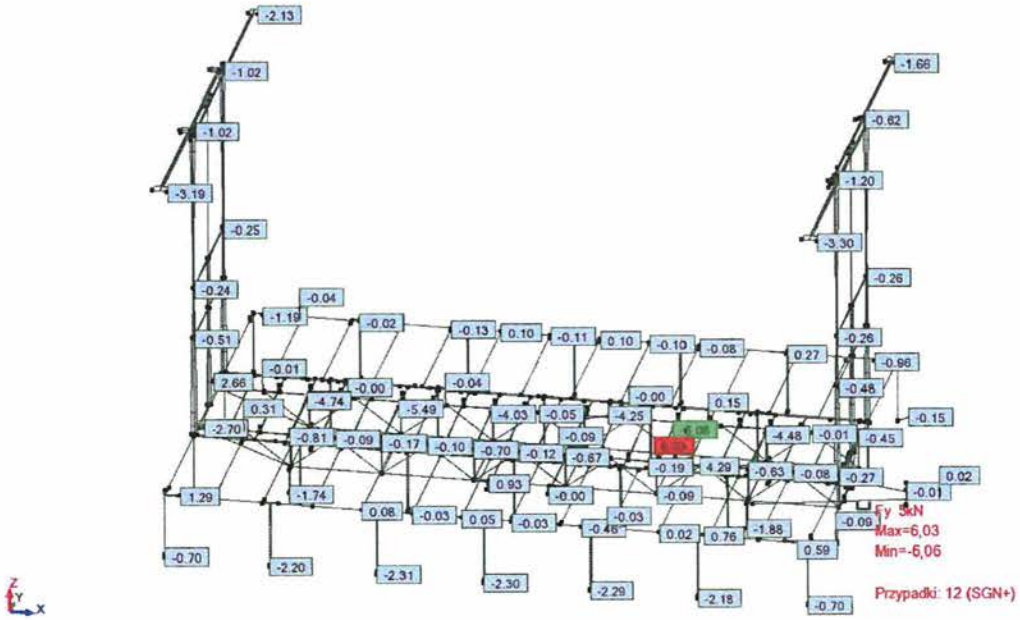




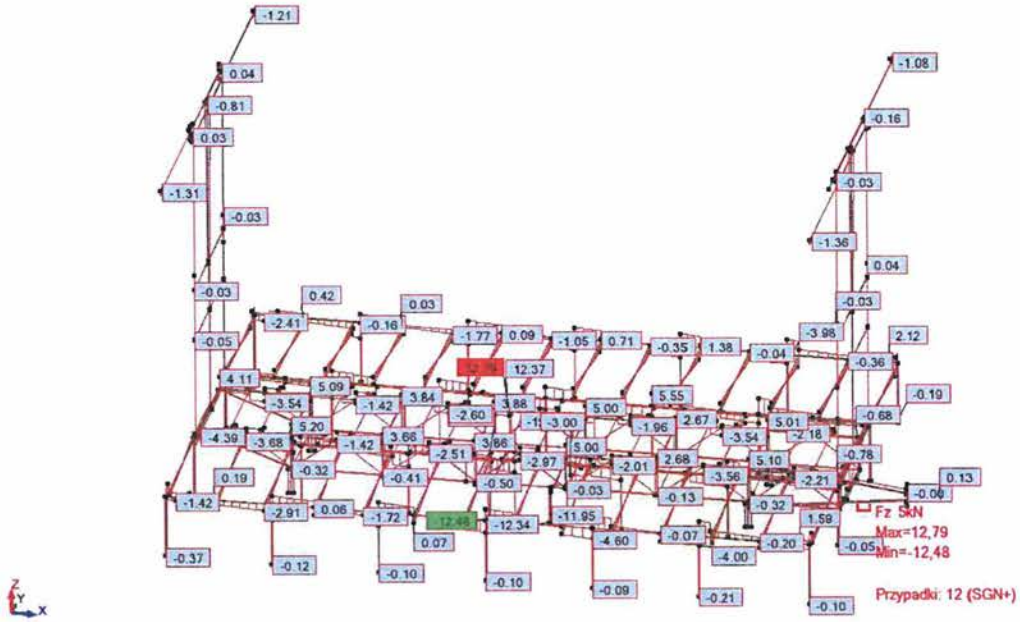
External forces for steel structure . Axial strengths Fx (SGN)



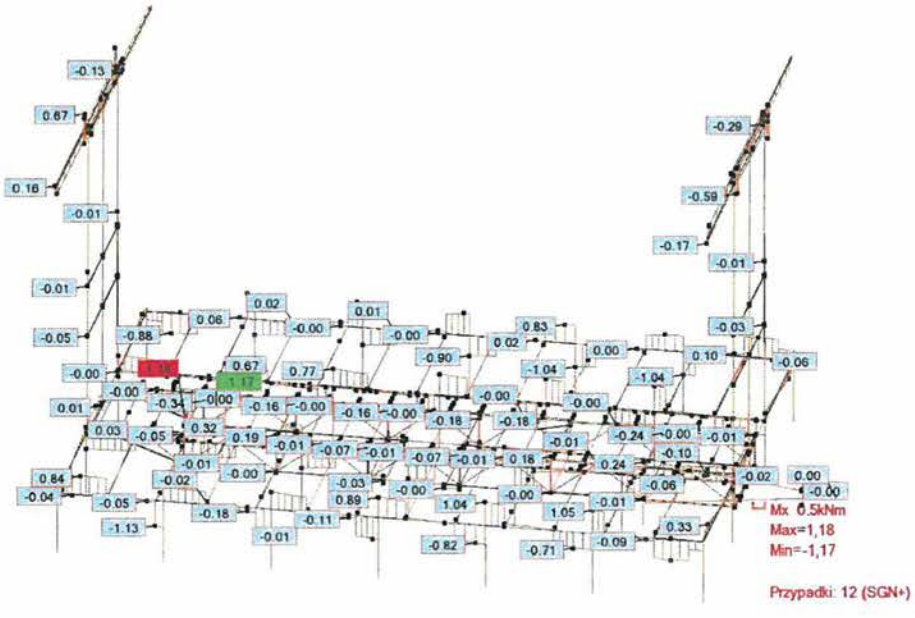
Shear forces Fy (SGN):



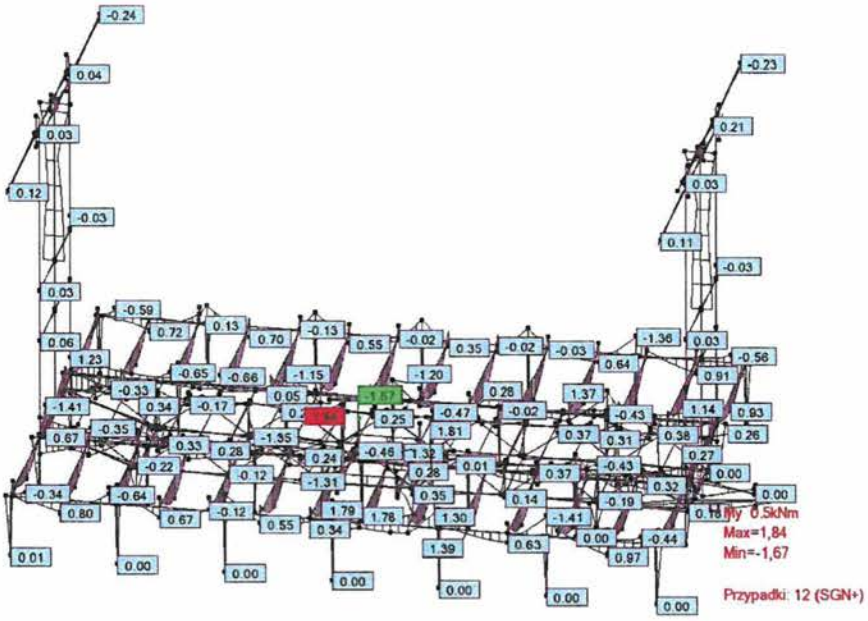
Shear for ces Fz (SGN)



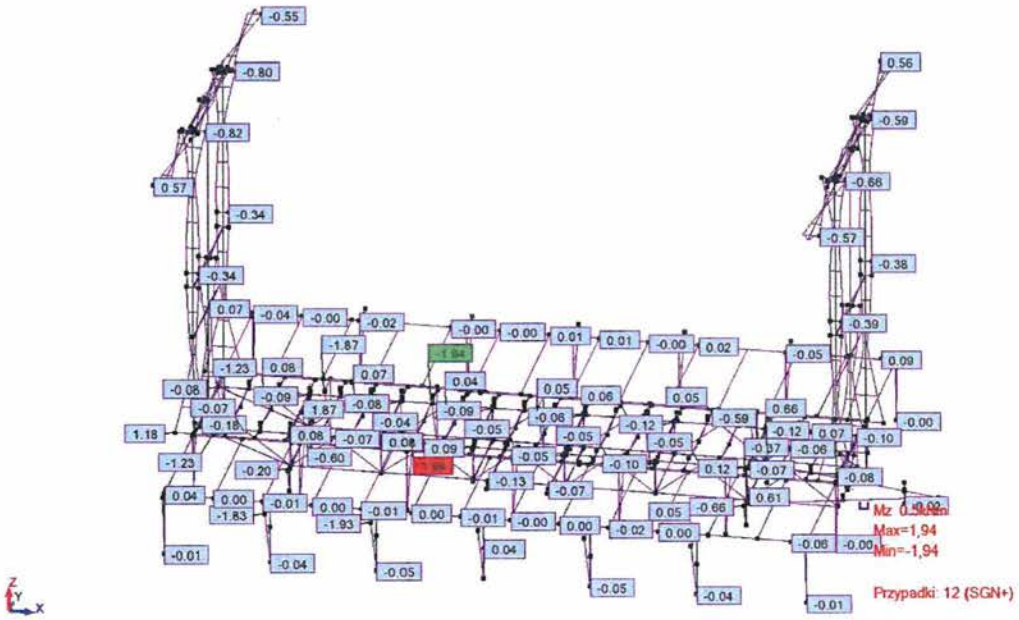
Torsion moment Mx (SGN):



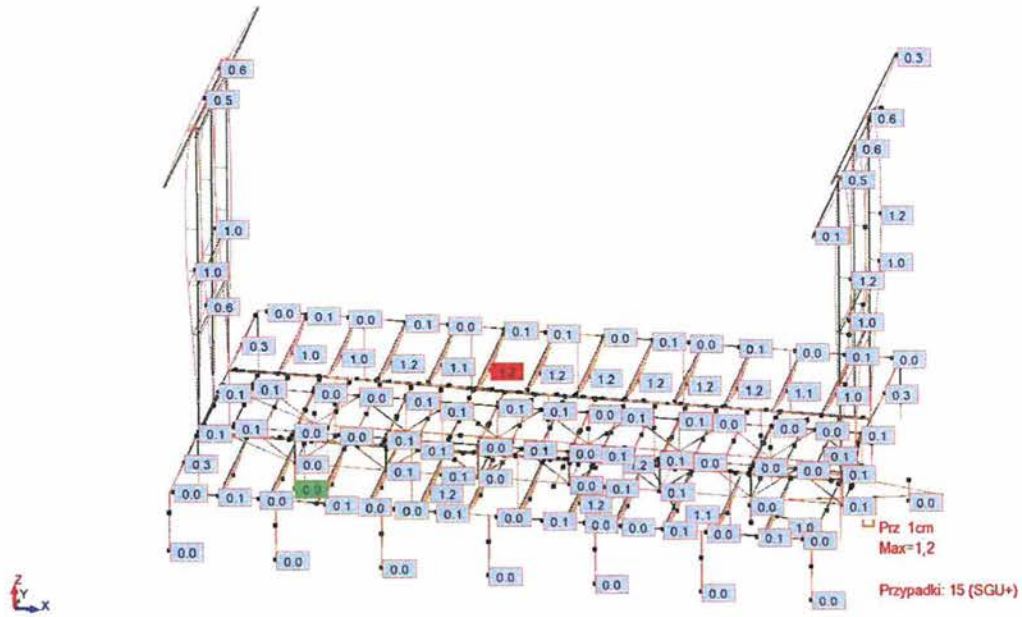
Bending moment My (SGN):

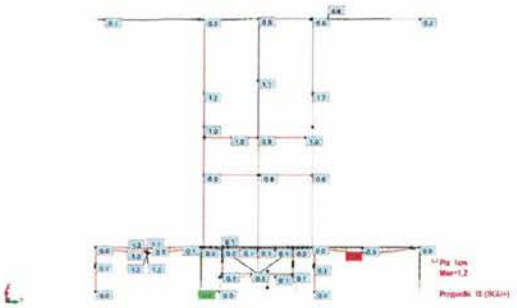


Bending moment Mz (SGN):



Displacements (SGU):

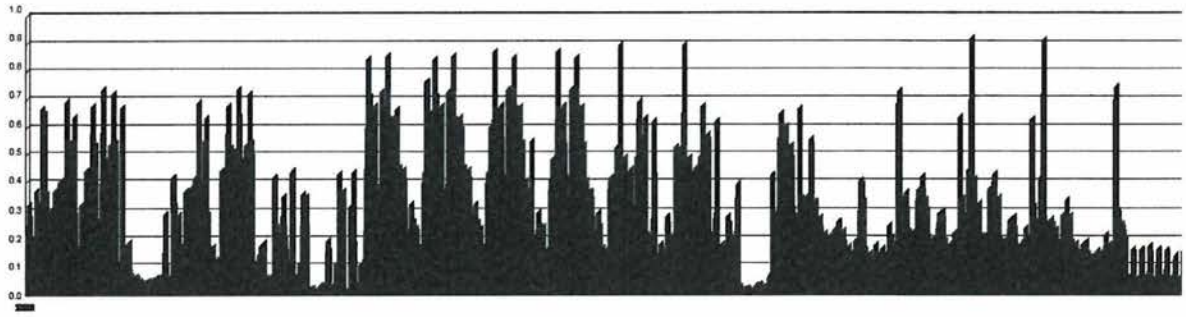




VI. DIMENSIONING **OF ELEMENTS**

Dimensioning of aluminum elements made in accordance with PN-EN 1993-1-1: 2005. Due to a number of structure elements (approximately 2300) please find enclosed a detailed table in appendix Z1.

Collective element strength for provided loads is 92%



Collective element strength for provided loads is 92%

Exemplary results of particular structure element dimensioning

Element of a central beam near the midspan

STANDARD: *PN-EN 1993-1-1:2005/AC:2006 , Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Weryfikacja prętów

GROUP:
BAR: 1323 Kratownica Aluminiowa_1323 **POINT:** 1 **CO-ORDINATE:** x = 0.50 L = 0.26 m

---

LOADS:
Decydujący przypadek obciążenia: 11 SGN /22/ 1*1.35 + 2*1.35 + 7*0.75 + 9*1.50

MATERIAL:
ALUM fy = 170.00 MPa

SECTION PARAMETERS: RO 50x2

h=5.0 cm	gM0=1.00	gM1=1.00	
b=5.0 cm	Ay=1.92 cm2	Az=1.92 cm2	Ax=3.02 cm2
tw=0.2 cm	Iy=8.70 cm4	Iz=8.70 cm4	Ix=17.40 cm4
tf=0.2 cm	Wply=4.61 cm3	Wplz=4.61 cm3	

INTERNAL AND LOAD-BEARING CAPACITY FORCES:

N,Ed = -34.74 kN	My,Ed = 0.05 kN*m	Mz,Ed = 0.01 kN*m	Vy,Ed = -0.01 kN
Nt,Rd = 51.27 kN	My,pl,Rd = 0.78 kN*m	Mz,pl,Rd = 0.78 kN*m	Tau,y,max,Ed = -0.09 MPa
	My,c,Rd = 0.78 kN*m	Mz,c,Rd = 0.78 kN*m	Vz,Ed = 0.59 kN
	My,N,Rd = 0.39 kN*m	Mz,N,Rd = 0.39 kN*m	Tau,z,max,Ed = 3.93 MPa
			Tt,Ed = -0.01 kN*m
			KLASA PRZEKROJU = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

względem osi Y: względem osi Z:

VERIFICATION FORMULAS:

Kontrola wytrzymałości przekroju:

N,Ed/Nt,Rd = 0.68 < 1.00 (6.2.3.(1))

My,Ed/My,c,Rd + Mz,Ed/Mz,c,Rd = 0.08 < 1.00 (6.2.5.(1))

(My,Ed/My,N,Rd)^ 2.00 + (Mz,Ed/Mz,N,Rd)^2.00 = 0.02 < 1.00 (6.2.9.1.(6))

(Tau,y,max,Ed + Tau,ty,Ed)/(fy/(sqrt(3)*gM0)) = 0.01 < 1.00 (6.2.6-7)

(Tau,z,max,Ed + Tau,tz,Ed)/(fy/(sqrt(3)*gM0)) = 0.05 < 1.00 (6.2.6-7)

Profil poprawny !!!

Diagonal brace of a central beam near the support (steel frame)

STANDARD: *PN-EN 1993-1-1:2005/AC:2006 , Eurocode 3: Design of steel structures.*

ANALYSIS TYPE: Weryfikacja prętów

GROUP:

BAR: 1249 Kratownica Aluminiowa_1249 **POINT:** 3 **CO-ORDINATE:** x = 1.00 L = 0.33 m

LOADS:

Decydujący przypadek obciążenia: 11 SGN /1/ 1*1.35 + 2*1.35 + 7*0.75 + 8*1.50 + 9*1.50 + 10*1.50

MATERIAL:

ALUM fy = 170.00 MPa

SECTION PARAMETERS: RO 20x1

h=2.0 cm	gM0=1.00	gM1=1.00	
b=2.0 cm	Ay=0.38 cm2	Az=0.38 cm2	Ax=0.60 cm2
tw=0.1 cm	Iy=0.27 cm4	Iz=0.27 cm4	Ix=0.54 cm4
tf=0.1 cm	Wply=0.36 cm3	Wplz=0.36 cm3	

INTERNAL AND LOAD-BEARING CAPACITY FORCES:

N,Ed = 3.49 kN	My,Ed = -0.00 kN*m	Mz,Ed = 0.00 kN*m	Vy,Ed = 0.00 kN
Nc,Rd = 10.15 kN	My,pl,Rd = 0.06 kN*m	Mz,pl,Rd = 0.06 kN*m	Tau,y,max,Ed = 0.07 MPa
Nb,Rd = 9.70 kN	My,c,Rd = 0.06 kN*m	Mz,c,Rd = 0.06 kN*m	Vz,Ed = -0.02 kN
	My,N,Rd = 0.05 kN*m	Mz,N,Rd = 0.05 kN*m	Tau,z,max,Ed = -0.62 MPa
			Tt,Ed = 0.00 kN*m
			KLASA PRZEKROJU = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

względem osi Y: względem osi Z:

Ly = 0.33 m	Lam_y = 0.39	Lz = 0.33 m	Lam_z = 0.39
Lcr,y = 0.17 m	Xy = 0.96	Lcr,z = 0.17 m	Xz = 0.96
Lamy = 24.61	kyy = 0.63	Lamz = 24.61	kyz = 0.42

VERIFICATION FORMULAS

Kontrola wytrzymałości przekroju:

N,Ed/Nc,Rd = 0.34 < 1.00 (6.2.4.(1))

My,Ed/My,c,Rd + Mz,Ed/Mz,c,Rd = 0.08 < 1.00 (6.2.5.(1))
(My,Ed/My,N,Rd)^ 2.00 + (Mz,Ed/Mz,N,Rd)^2.00 = 0.01 < 1.00 (6.2.9.1.(6))
(Tau,y,max,Ed + Tau,ty,Ed)/(fy/(sqrt(3)*gM0)) = 0.00 < 1.00 (6.2.6-7)
(Tau,z,max,Ed + Tau,tz,Ed)/(fy/(sqrt(3)*gM0)) = 0.01 < 1.00 (6.2.6-7)
Kontrola stateczności globalnej pręta:
Lambda,y = 24.61 < Lambda,max = 250.00 Lambda,z = 24.61 < Lambda,max = 250.00 STABILNY
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed/(XLT*My,Rk/gM1) + kyz*Mz,Ed/(Mz,Rk/gM1) = 0.41 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed/(XLT*My,Rk/gM1) + kzz*Mz,Ed/(Mz,Rk/gM1) = 0.39 < 1.00 (6.3.3.(4))

Profil poprawny !!!

Element of a central beam near the midspan

STANDARD: *PN-EN 1993-1-1:2005/AC:2006 , Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Weryfikacja prętów

GROUP:
BAR: 828 Kratownica Aluminiowa_828 **POINT:** 3 **CO-ORDINATE:** x = 1.00 L = 0.53 m

---

LOADS:
Decydujący przypadek obciążenia: 11 SGN /274/ 1*1.00 + 2*1.00 + 6*0.27 + 8*1.50 + 10*1.50

MATERIAL:
ALUM fy = 170.00 MPa

SECTION PARAMETERS: RO 50x2

h=5.0 cm	gM0=1.00	gM1=1.00	
b=5.0 cm	Ay=1.92 cm2	Az=1.92 cm2	Ax=3.02 cm2
tw=0.2 cm	Iy=8.70 cm4	Iz=8.70 cm4	Ix=17.40 cm4
tf=0.2 cm	Wply=4.61 cm3	Wplz=4.61 cm3	

INTERNAL AND LOAD-BEARING CAPACITY FORCES:

N,Ed = -14.12 kN	My,Ed = 0.23 kN*m	Mz,Ed = -0.01 kN*m	Vy,Ed = 0.02 kN
Nt,Rd = 51.27 kN	My,pl,Rd = 0.78 kN*m	Mz,pl,Rd = 0.78 kN*m	Tau,y,max,Ed = 0.11 MPa
	My,c,Rd = 0.78 kN*m	Mz,c,Rd = 0.78 kN*m	Vz,Ed = 0.92 kN
	My,N,Rd = 0.72 kN*m	Mz,N,Rd = 0.72 kN*m	Tau,z,max,Ed = 6.09 MPa
			Tt,Ed = -0.00 kN*m
			KLASA PRZEKROJU = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

względem osi Y: względem osi Z:

VERIFICATION FORMULAS:
Kontrola wytrzymałości przekroju:
N,Ed/Nt,Rd = 0.28 < 1.00 (6.2.3.(1))
My,Ed/My,c,Rd + Mz,Ed/Mz,c,Rd = 0.30 < 1.00 (6.2.5.(1))
(My,Ed/My,N,Rd)^ 2.00 + (Mz,Ed/Mz,N,Rd)^2.00 = 0.10 < 1.00 (6.2.9.1.(6))
(Tau,y,max,Ed + Tau,ty,Ed)/(fy/(sqrt(3)*gM0)) = 0.01 < 1.00 (6.2.6-7)
(Tau,z,max,Ed + Tau,tz,Ed)/(fy/(sqrt(3)*gM0)) = 0.07 < 1.00 (6.2.6-7)

Profil poprawny !!!

Element of the main column near the support (elevated platform bearings):

STANDARD: *PN-EN 1993-1-1:2005/AC:2006 , Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Weryfikacja prętów

GROUP:
BAR: 2026 Kratownica Aluminiowa_2026 **POINT:** 1 **CO-ORDINATE :** x = 0.00 L = 0.00 m

---

LOADS:
Decydujący przypadek obciążenia: 11 SGN /9/ 1*1.35 + 2*1.35 + 6*0.27 + 7*0.75 + 8*1.50 + 9*1.50 + 10*1.50

MATERIAL:
ALUM fy = 170.00 MPa

SECTION PARAMETERS: RO 50x2

h=5.0 cm	gM0=1.00	gM1=1.00	
b=5.0 cm	Ay=1.92 cm2	Az=1.92 cm2	Ax=3.02 cm2
tw=0.2 cm	Iy=8.70 cm4	Iz=8.70 cm4	Ix=17.40 cm4
tf=0.2 cm	Wply=4.61 cm3	Wplz=4.61 cm3	

INTERNAL AND LOAD-BEARING CAPACITY FORCES:

N,Ed = 10.04 kN	My,Ed = 0.11 kN*m	Mz,Ed = 0.02 kN*m	Vy,Ed = -0.11 kN
Nc,Rd = 51.27 kN	My,pl,Rd = 0.78 kN*m	Mz,pl,Rd = 0.78 kN*m	Tau,y,max,Ed = -0.74 MPa
Nb,Rd = 51.27 kN	My,c,Rd = 0.78 kN*m	Mz,c,Rd = 0.78 kN*m	Vz,Ed = -0.34 kN
	My,N,Rd = 0.76 kN*m	Mz,N,Rd = 0.76 kN*m	Tau,z,max,Ed = -2.28 MPa
			Tt,Ed = -0.00 kN*m
			KLASA PRZEKROJU = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

względem osi Y:

Ly = 0.25 m	Lam_y = 0.12
Lcr,y = 0.13 m	Xy = 1.00
Lamy = 7.36	kyy = 0.75

względem osi Z:

Lz = 0.25 m	Lam_z = 0.12
Lcr,z = 0.13 m	Xz = 1.00
Lamz = 7.36	kyz = 0.47

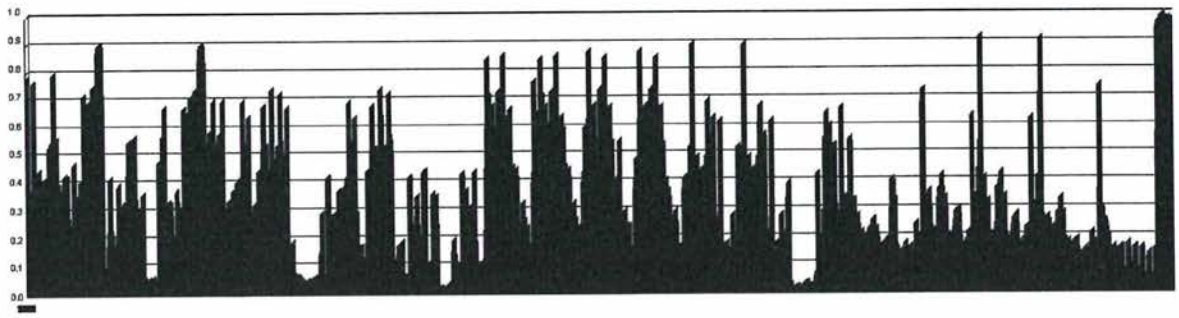
VERIFICATION FORMULAS:

Kontrola wytrzymałości przekroju:
N,Ed/Nc,Rd = 0.20 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd + Mz,Ed/Mz,c,Rd = 0.17 < 1.00 (6.2.5.(1))
(My,Ed/My,N,Rd)^ 2.00 + (Mz,Ed/Mz,N,Rd)^2.00 = 0.02 < 1.00 (6.2.9.1.(6))
(Tau,y,max,Ed + Tau,ty,Ed)/(fy/(sqrt(3)*gM0)) = 0.01 < 1.00 (6.2.6-7)
(Tau,z,max,Ed + Tau,tz,Ed)/(fy/(sqrt(3)*gM0)) = 0.03 < 1.00 (6.2.6-7)
Kontrola stateczności globalnej pręta:
Lambda,y = 7.36 < Lambda,max = 250.00 Lambda,z = 7.36 < Lambda,max = 250.00 STABILNY
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed/(XLT*My,Rk/gM1) + kyz*Mz,Ed/(Mz,Rk/gM1) = 0.31 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed/(XLT*My,Rk/gM1) + kzz*Mz,Ed/(Mz,Rk/gM1) = 0.28 < 1.00 (6.3.3.(4))

Profil poprawny !!!

Steel element dimensioning performed according to PEN-EN 1993-1-1: 2005 standard. Due to a number of structure elements (approximately 250), a detailed table is included in an appendix Z2.

Collective strength of elements show on the chart



Maximum strength of elements for given loads is 100%

Exemplary results of dimensioning of particular structure elements:

Extreme elevated platform beam

STANDARD *PN-EN 1993-1-1:2005/AC:2006 , Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Weryfikacja prętów

GROUP:
BAR: 190 Belka podestu_190 **POINT:** 3 **CO-ORDINATE :** x = 0.50 L = 0.97 m

---

LOADS:
Decydujący przypadek obciążenia: 11 SGN /54/ 1*1.35 + 2*1.35 + 4*0.27 + 7*0.75 + 8*1.50 + 10*1.50

MATERIAL:
S 275 (S 275) fy = 275.00 MPa

SECTION PARAMETERS: RK 40x3

h=4.0 cm	gM0=1.00	gM1=1.00	
b=4.0 cm	Ay=2.11 cm2	Az=2.11 cm2	Ax=4.21 cm2
tw=0.3 cm	Iy=9.32 cm4	Iz=9.32 cm4	Ix=15.75 cm4
tf=0.3 cm	Wply=5.72 cm3	Wplz=5.72 cm3	

INTERNAL AND LOAD-BEARING CAPACITY FORCES

N,Ed = 0.55 kN	My,Ed = 1.40 kN*m	Mz,Ed = 0.00 kN*m	Vy,Ed = 0.00 kN
Nc,Rd = 115.78 kN	My,pl,Rd = 1.57 kN*m	Mz,pl,Rd = 1.57 kN*m	Tau,y,max,Ed = 0.00 MPa
Nb,Rd = 115.78 kN	My,c,Rd = 1.57 kN*m	Mz,c,Rd = 1.57 kN*m	Vz,Ed = 0.32 kN
	My,N,Rd = 1.57 kN*m	Mz,N,Rd = 1.57 kN*m	Tau,z,max,Ed = 1.79 MPa
	Mb,Rd = 1.57 kN*m		Tt,Ed = 0.00 kN*m
			KLASA PRZEKROJU = 1

LATERAL BUCKLING PARAMETERS:

z = 1.00	Mcr = 27.87 kN*m	Krzywa,LT - a	XLT = 1.00
Lcr,upp=1.95 m	Lam_LT = 0.24	fi,LT = 0.00	XLT,mod = 1.00

BUCKLING PARAMETERS:

względem osi Y: kyy = 1.00

względem osi Z: kzz = 1.00

VERIFICATION FORMULAS:

Kontrola wytrzymałości przekroju:
N,Ed/Nc,Rd = 0.00 < 1.00 (6.2.4.(1))
My,Ed/My,c,Rd + Mz,Ed/Mz,c,Rd = 0.89 < 1.00 (6.2.5.(1))
(My,Ed/My,N,Rd)^ 1.66 + (Mz,Ed/Mz,N,Rd)^1.66 = 0.83 < 1.00 (6.2.9.1.(6))
(Tau,y,max,Ed + Tau,ty,Ed)/(fy/(sqrt(3)*gM0)) = 0.00 < 1.00 (6.2.6-7)
(Tau,z,max,Ed + Tau,tz,Ed)/(fy/(sqrt(3)*gM0)) = 0.01 < 1.00 (6.2.6-7)
Kontrola stateczności globalnej pręta:
My,Ed/Mb,Rd = 0.89 < 1.00 (6.3.2.1.(1))
N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed/(XLT*My,Rk/gM1) + kyz*Mz,Ed/(Mz,Rk/gM1) = 0.90 < 1.00 (6.3.3.(4))
N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed/(XLT*My,Rk/gM1) + kzz*Mz,Ed/(Mz,Rk/gM1) = 0.90 < 1.00 (6.3.3.(4))

MAXIMUM DISPLACEMENTS

Ugięcia
uy = 0.0 cm < uy max = L/150.00 = 1.3 cm Zweryfikowano
Decydujący przypadek obciążenia: 14 SGU /5/ 1*1.00 + 2*1.00 + 8*0.70 + 9*0.70
uz = 1.2 cm < uz max = L/150.00 = 1.3 cm Zweryfikowano
Decydujący przypadek obciążenia: 14 SGU /7/ 1*1.00 + 2*1.00 + 8*0.70 + 10*0.70

Przemieszczenia *Nie analizowano*

Profil poprawny !!!

Beam of a trailer frame near an axe:

STANDARD *PN-EN 1993-1-1:2005/AC:2006 , Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Weryfikacja prętów

GROUP:
BAR: 69 Rama Główna_69 **POINT:** 3 **CO-ORDINATE:** x = 1.00 L = 0.20 m

---

LOADS:
Decydujący przypadek obciążenia: 11 SGN /132/ 1*1.35 + 2*1.00 + 6*0.27 + 8*1.50 + 10*1.50

MATERIAL:
S 275 (S 275) fy = 275.00 MPa

SECTION PARAMETERS: RP 70x40x2

h=7.0 cm	gM0=1.00	gM1=1.00	
b=4.0 cm	Ay=1.60 cm2	Az=2.64 cm2	Ax=4.24 cm2
tw=0.2 cm	Iy=28.08 cm4	Iz=11.67 cm4	Ix=25.20 cm4
tf=0.2 cm	Wply=9.80 cm3	Wplz=6.62 cm3	

INTERNAL AND LOAD-BEARING CAPACITY FORCES :

N,Ed = -1.45 kN	My,Ed = 1.92 kN*m	Mz,Ed = -0.15 kN*m	Vy,Ed = 1.35 kN
Nt,Rd = 116.60 kN	My,pl,Rd = 2.69 kN*m	Mz,pl,Rd = 1.82 kN*m	Tau,y,max,Ed = 9.53 MPa
	My,c,Rd = 2.69 kN*m	Mz,c,Rd = 1.82 kN*m	Vz,Ed = 12.92 kN
	My,N,Rd = 2.69 kN*m	Mz,N,Rd = 1.82 kN*m	Tau,z,max,Ed = 56.35 MPa
			Tt,Ed = -0.18 kN*m
			KLASA PRZEKROJU = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

względem osi Y: względem osi Z:

VERIFICATION FORMULAS:
Kontrola wytrzymałości przekroju:
N,Ed/Nt,Rd = 0.01 < 1.00 (6.2.3.(1))
My,Ed/My,c,Rd + Mz,Ed/Mz,c,Rd = 0.79 < 1.00 (6.2.5.(1))
(My,Ed/My,N,Rd)^ 1.66 + (Mz,Ed/Mz,N,Rd)^1.66 = 0.58 < 1.00 (6.2.9.1.(6))
(Tau,y,max,Ed + Tau,ty,Ed)/(fy/(sqrt(3)*gM0)) = 0.17 < 1.00 (6.2.6-7)
(Tau,z,max,Ed + Tau,tz,Ed)/(fy/(sqrt(3)*gM0)) = 0.47 < 1.00 (6.2.6-7)

Profil poprawny !!!

Elevated platform's column

STANDARD: *PN-EN 1993-1-1:2005/AC:2006 , Eurocode 3: Design of steel structures.*
ANALYSIS TYPE: Weryfikacja prętów

GROUP:
BAR: 2936 Słupy podstawy_2936 **POINT:** 1 **CO-ORDINATE:** x = 0.00 L = 0.00 m

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LOADS:
Decydujący przypadek obciążenia: 11 SGN /128/ 1*1.35 + 2*1.00 + 3*0.27 + 8*1.50 + 10*1.50

MATERIAL:
S 275 (S 275) fy = 275.00 MPa

SECTION PARAMETERS: RO 48.3x3.6

h=4.8 cm	gM0=1.00	gM1=1.00	
b=4.8 cm	Ay=3.22 cm2	Az=3.22 cm2	Ax=5.06 cm2
tw=0.4 cm	Iy=12.70 cm4	Iz=12.70 cm4	Ix=25.40 cm4
tf=0.4 cm	Wply=7.21 cm3	Wplz=7.21 cm3	

INTERNAL AND LOAD-BEARING CAPACITY FORCES:

N,Ed = 10.52 kN	My,Ed = 0.07 kN*m	Mz,Ed = 1.89 kN*m	Vy,Ed = 2.23 kN
Nc,Rd = 139.15 kN	My,pl,Rd = 1.98 kN*m	Mz,pl,Rd = 1.98 kN*m	Tau,y,max,Ed = 8.79 MPa

Nb,Rd = 131.75 kN	My,c,Rd = 1.98 kN*m	Mz,c,Rd = 1.98 kN*m	Vz,Ed = -0.08 kN
	My,N,Rd = 1.98 kN*m	Mz,N,Rd = 1.98 kN*m	Tau,z,max,Ed = -0.31 MPa
			KLASA PRZEKROJU = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

względem osi Y:

Ly = 0.83 m	Lam_y = 0.42	Lz = 0.83 m	Lam_z = 0.42
Lcr,y = 0.58 m	Xy = 0.95	Lcr,z = 0.58 m	Xz = 0.95
Lamy = 36.67	kzy = 0.46	Lamz = 36.67	kzz = 0.77

względem osi Z:

VERIFICATION FORMULAS:

Kontrola wytrzymałości przekroju:

N,Ed/Nc,Rd = 0.08 < 1.00 (6.2.4.(1))

My,Ed/My,c,Rd + Mz,Ed/Mz,c,Rd = 0.99 < 1.00 (6.2.5.(1))

(My,Ed/My,N,Rd)^ 2.00 + (Mz,Ed/Mz,N,Rd)^2.00 = 0.91 < 1.00 (6.2.9.1.(6))

Tau,y,max,Ed/(fy/(sqrt(3)*gM0)) = 0.06 < 1.00 (6.2.6.(4))

Tau,z,max,Ed/(fy/(sqrt(3)*gM0)) = 0.00 < 1.00 (6.2.6.(4))

Kontrola stateczności globalnej pręta:

Lambda,y = 36.67 < Lambda,max = 250.00 Lambda,z = 36.67 < Lambda,max = 250.00 STABILNY

N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed/(XLT*My,Rk/gM1) + kyz*Mz,Ed/(Mz,Rk/gM1) = 0.55 < 1.00 (6.3.3.(4))

N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed/(XLT*My,Rk/gM1) + kzz*Mz,Ed/(Mz,Rk/gM1) = 0.83 < 1.00 (6.3.3.(4))

MAXIMUM DISPLACEMENTS

Ugięcia *Nie analizowano*

Przemieszczenia

vx = 0.0 cm < vx max = L/150.00 = 0.6 cm Zweryfikowano

Decydujący przypadek obciążenia: 14 SGU /34/ 1*1.00 + 2*1.00 + 3*0.06 + 8*0.60 + 10*0.60

vy = 0.0 cm < vy max = L/150.00 = 0.6 cm Zweryfikowano

Decydujący przypadek obciążenia: 14 SGU /27/ 1*1.00 + 2*1.00 + 5*0.06 + 8*0.60 + 9*0.60

Profil poprawny !!!

Aluminum support structure's column

STANDARD: *PN-EN 1993-1-1:2005/AC:2006 , Eurocode 3: Design of steel structures.*

ANALYSIS TYPE: Weryfikacja prętów

GROUP:

PRĘT: 349 Pręt_349 **POINT:** 3 **CO-ORDINATE:** x = 1.00 L = 2.00 m

LOADS:

Decydujący przypadek obciążenia: 11 SGN /3/ 1*1.35 + 2*1.35 + 4*0.27 + 7*0.75 + 8*1.50 + 9*1.50 + 10*1.50

MATERIAL:

S 275 (S 275) fy = 275.00 MPa

SECTION PARAMETERS: RP 50x30x3

h=5.0 cm	gM0=1.00	gM1=1.00	
b=3.0 cm	Ay=1.58 cm2	Az=2.63 cm2	Ax=4.21 cm2
tw=0.3 cm	Iy=12.83 cm4	Iz=5.70 cm4	Ix=13.53 cm4
tf=0.3 cm	Wply=6.57 cm3	Wplz=4.58 cm3	

INTERNAL AND LOAD-BEARING CAPACITY FORCES

N,Ed = 3.30 kN	My,Ed = 0.03 kN*m	Mz,Ed = 0.63 kN*m	Vy,Ed = -0.71 kN
Nc,Rd = 115.78 kN	My,pl,Rd = 1.81 kN*m	Mz,pl,Rd = 1.26 kN*m	Tau,y,max,Ed = -5.11 MPa
Nb,Rd = 26.29 kN	My,c,Rd = 1.81 kN*m	Mz,c,Rd = 1.26 kN*m	Vz,Ed = 0.03 kN
	My,N,Rd = 1.81 kN*m	Mz,N,Rd = 1.26 kN*m	Tau,z,max,Ed = 0.13 MPa
			Tt,Ed = 0.00 kN*m
			KLASA PRZEKROJU = 1

LATERAL BUCKLING PARAMETERS:

BUCKLING PARAMETERS:

względem osi Y:

Ly = 2.00 m	Lam_y = 1.32
Lcr,y = 2.00 m	Xy = 0.46
Lamy = 114.57	kzy = 0.67

względem osi Z:

Lz = 2.00 m	Lam_z = 1.98
Lcr,z = 2.00 m	Xz = 0.23
Lamz = 171.88	kzz = 1.07

VERIFICATION FORMULAS

Kontrola wytrzymałości przekroju:

N,Ed/Nc,Rd = 0.03 < 1.00 (6.2.4.(1))

My,Ed/My,c,Rd + Mz,Ed/Mz,c,Rd = 0.52 < 1.00 (6.2.5.(1))

(My,Ed/My,N,Rd)^ 1.66 + (Mz,Ed/Mz,N,Rd)^1.66 = 0.32 < 1.00 (6.2.9.1.(6))

(Tau,y,max,Ed + Tau,ty,Ed)/(fy/(sqrt(3)*gM0)) = 0.04 < 1.00 (6.2.6-7)

(Tau,z,max,Ed + Tau,tz,Ed)/(fy/(sqrt(3)*gM0)) = 0.00 < 1.00 (6.2.6-7)

Kontrola stateczności globalnej pręta:

Lambda,y = 114.57 < Lambda,max = 250.00 Lambda,z = 171.88 < Lambda,max = 250.00 STABILNY

N,Ed/(Xy*N,Rk/gM1) + kyy*My,Ed/(XLT*My,Rk/gM1) + kyz*Mz,Ed/(Mz,Rk/gM1) = 0.44 < 1.00 (6.3.3.(4))

N,Ed/(Xz*N,Rk/gM1) + kzy*My,Ed/(XLT*My,Rk/gM1) + kzz*Mz,Ed/(Mz,Rk/gM1) = 0.67 < 1.00 (6.3.3.(4))

Profil poprawny !!!

VII. STRUCTURE ROOM VERIFICATION

Allowable displacements according to PN-EN 1993-1-1 in relation to EN 1990/Appendix A1.4 and agreed with an investor.

Due to temporary nature of the object, support insensitive to displacements and temporary nature of the load, allowable vertical displacement of elements was accepted as L/150. Maximum allowable displacement of stage canopy enclosure 8m/150=5, 3 cm, maximum displacement of aluminum covering read from the chart is 5 cm. Maximum allowable displacement of platform's beams 2 m/ 150=1,3 cm, maximum displacement of platform's beams read from the chart is 1, 2 cm .

Column vertical displacements accepted as L/150 which for the height approximately 5 m gives 3,3 cm. Maximum vertical displacement of columns read from the charts is 1,2 cm

All displacement conditions are met.

IX. CONCLUSIONS AND FINAL REMARKS

1. Due to nature of the aluminium covering structure, the main action which affects both load bearing capacity and structure displacement is wind load. Even if the allowable load value for 70km/h speed is slightly exceeded, it may cause displacement of limit states and what follows it structure damage.

2. Stability of aluminum structure is provided by stays in a form of belts. Without belts being fastened, support cannot be installed. Stays must be fixed in foundations or with the aid of anchors so that they could transfer force approximately 14KN (force acting in the direction of a stay).

3. Vertical loads (speakers, lighting) has a considerable impact on aluminum structure operation (mainly the suspended one in the centre of midspan of girders) and one cannot exceed load value provided in the document. Approximately 10% load increase on columns and on side

beams is allowable. In the event it is necessary to increase loads, verification calculations are required.

4. Neither snow nor greater amount of water can accumulate on a roof surface. A limit value given in a document is 8 mm of water

5. In order to improve structure's work, it is recommended to reinforce aluminum structure joints using angle struts made of pipes.

6. Steel structure of „ trailer" in a form of main frames and elevated platform provides enough structure stiffness. Platform load up to 500 kg/m2 (5KN/m2) is allowable. The value above remains the same unless we perform additional upgrading.