ORDER NO.:15-02-24/4

STATICS REVIEW EXPERT OPINION

(ACCORDING TO EC)

NAME: **OK ZÁBRADLIA "CHS40x2 + naváraná príruba"**
OK RAILINGS "CHS40x2+ welded flange"

INVESTOR: ***VLADIMÍR LACKO – UMAKOV***

FRIČOVCE 309

CREATED BY: **Ing. POLÁK Jozef**

(*signature, stamp*: **Ing. Jozef POLÁK, Authorized Civil Engineer, 0592 – 13, Statics of Building Structures**)

In PREŠOV, February 2015

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SECTION: **1.2   STATIC SOLUTION**

TECHNICAL REPORT FOR THE CALCULATION

As requested by the Client, statics review was performed and an expert opinion issued for the construction of the "CHS40x2" railing.

The design of the construction consists of circular steel tubular profiles. The cross-section of the columns is CHS 40x2 mm, the axial distance between the columns is 0.9 m and the height of the columns is 1.0 m. The columns are anchored to the substrate via a knocking section.

The calculation was carried out with the use of the ADVANCE DESIGN program in accordance with the pertaining EUROCODES:

EC1 – ACTIONS ON STRUCTURES,

EC3 – DESIGN OF STEEL STRUCTURES,

The calculation illustrates the load bearing capacity of the steel elements and the design of their anchorage to the substrate.

The expert statics opinion issued for the structure illustrates the mechanical resistance of its elements and the stability of its support construction.

In PREŠOV, February 2015   Ing. POLÁK Jozef

6.3 Characteristic values of imposed loads

6.3.1 Residential, social, commercial and administrative zones

6.3.1.1 Categories

(1) P The zones in residential, social, commercial and administrative buildings are classified according to their specific use into categories of use as shown in Table 6.1.

(2) P Irrespective of this classification, dynamic effects must be considered in cases where the action on structure is expected to cause serious dynamic effects (see2.2(3) and (5)P).

Table 6.1 – Categories of use

Category	Specific Use	Example
A	Areas used for domestic activities and residential areas	Rooms in residential buildings and detached homes; bedrooms and corridors in hospitals; bedrooms in hotels and kitchens and toilet facilities in hostels.
B	Office areas	
C	Areas where crowds of people could gather (except for areas included in categories A,B and D)	**C1:** Areas with tables, etc. such as schools, cafés, restaurants, dining rooms, reading rooms and reception areas. **C2:** Areas with fixed seating such as churches, theatres or cinema theatres, conference rooms, event rooms, meeting rooms, waiting areas and railway station waiting rooms. **C3:** Areas with no obstacles to prevent the movement of people, such as museums, exhibition halls, etc. and halls in public and government buildings, hotels, hospitals and railway station waiting rooms. **C4:** Areas used for physical activities such as dance halls, gymnasiums and stages. **C5:** Areas where large crowds gather, such as buildings in which public events are held, including concert halls, sports pavilions and tiered seating, terraces and railway access areas and platforms.
D	Commercial areas	**D1:** Retail establishment areas. **D2:** Department store areas.

1) Special consideration must be taken with regard to 6.3.1.1(2) and particularly for the category C4 and C5. Expected dynamic effects are described in EN 1990. For category E, see Table 6.3.

NOTE 1. – According to the expected method of use, the areas included in categories C2, C3, C4 may be classified in the C5 category, upon the discretion of the Client and/or the National Annex.

NOTE 2. – The National Annex may extend the classification by adding subcategories to category A, B, C1 to C5, D1 or D2, respectively.

NOTE 3. – Areas used for storage of goods and industrial activities are specified in 6.3.2.

Geometry

CROSS-SECTIONS: CHS40x2 – COLUMNS

                            D12.0/2.5 – STRUCTURAL PARTS

Load

MATERIAL: - STEEL (STRUCTURE) EN 1.4301 (X5CrNi18-10); $Rm=540MPa$; $Rp_{0.2}=230MPa$

1. TYPE OF LOAD – SELF-WEIGHT (AUTOMATICALLY GENERATED BY THE PROGRAM)
2. TYPE OF LOAD – IMPOSED LOADS (CATEGORY A, B, C1, C2, C3, C4)

Properties of the structure

Properties of the structure	
Height	$h = 1\ 000.00$ mm

Description of load types and combinations

Description of load types and combinations		
Type no.	Name	Description
1	G	*Permanent load – self-weight*
2	Q	*Imposed loads – CATEGORY A, B, C1, C2, C3, C4*
101	1x[1 G]	
102	1.35x[1 G]	
103	1x[1 G]+1.5x[2 G]	
104	1.35x[1 G]+ 1.5x[2 G]	
105	1x[1 G]	
106	1x[1 G]+ 1x[2 G]	
107	1x[1 G]	
108	1x[1 G]+0.6x[2 G]	

Description of combinations

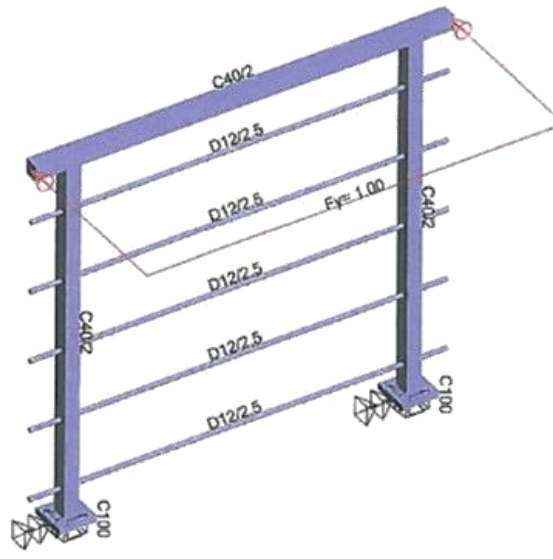| Description of combinations			
No.	Name	Details	Code
101	1x[1 G]	1.00*1	ECELUSTR
102	1.35x[1 G]	1.35*1	ECELUSTR
103	1x[1 G]+ 1.5x[2 G]	1.00*1+1.50*2	ECELUSTR
104	1.35x[1 G]+1.5x[2 G]	1.35*1+1.50*2	ECELUSTR
105	1x[1 G]	1.00*1	ECELSCQ
106	1x[1 G]+ 1x[2 G]	1.00*1+1.00*2	ECELSCQ
107	1x[1 G]	1.00*1	ECELSCQ
108	1x[1 G]+ 0.6x[2 G]	1.00*1+0.60*2	ECELSCQ
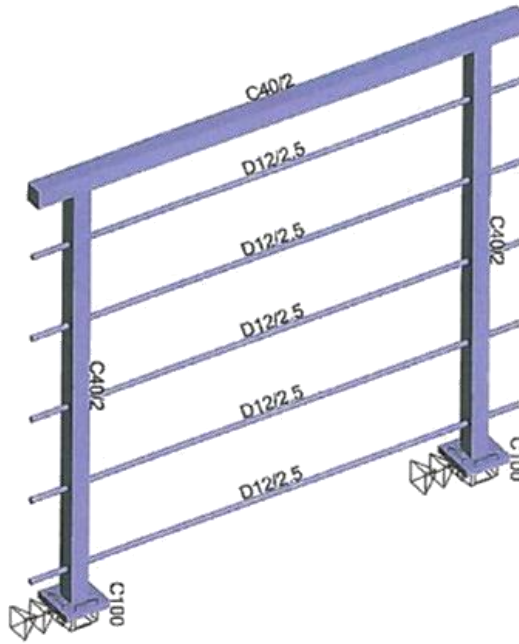
1) 3D Model

2) *Load*

User´s View
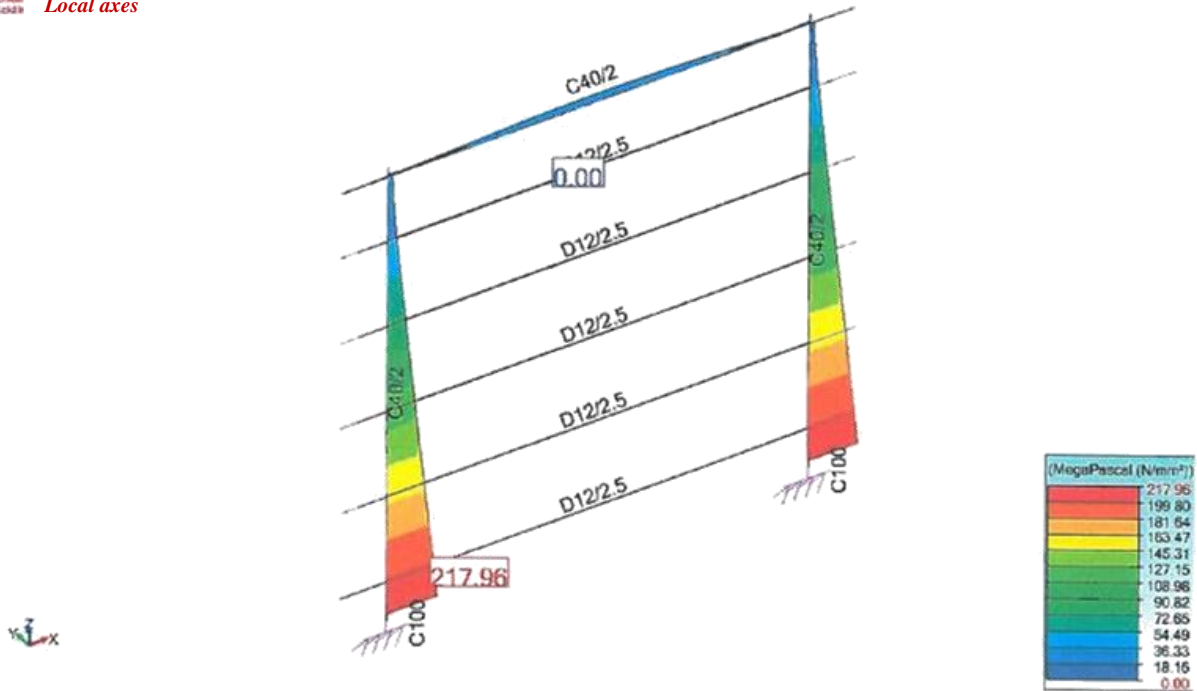*Calculation: D9, 110 (Graphic cover –*
MaxAbs
Linear element: D Surface element C
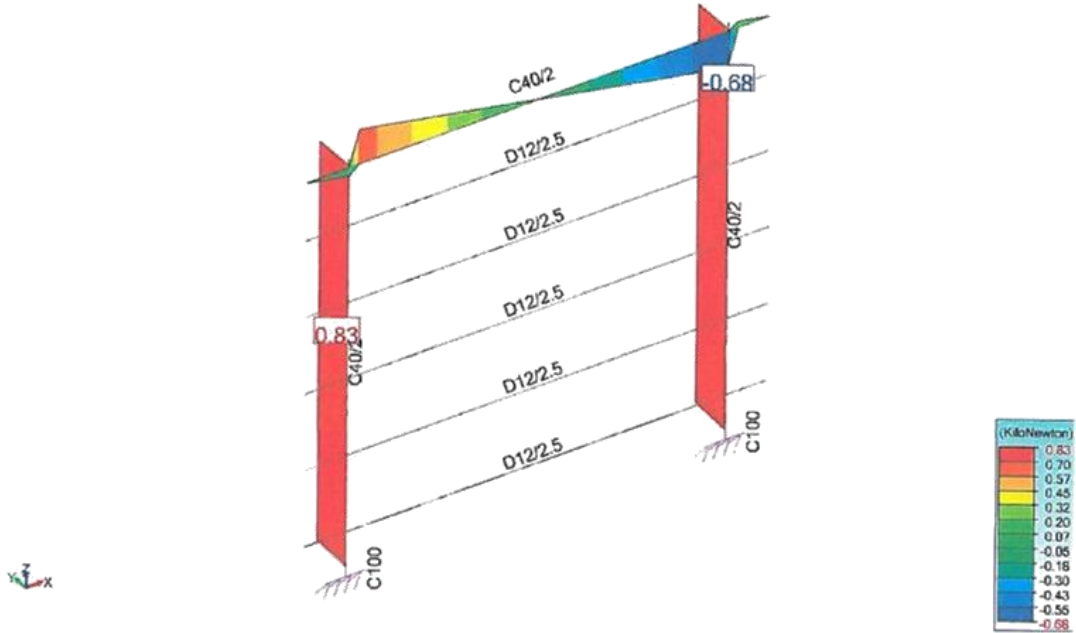*Global System*
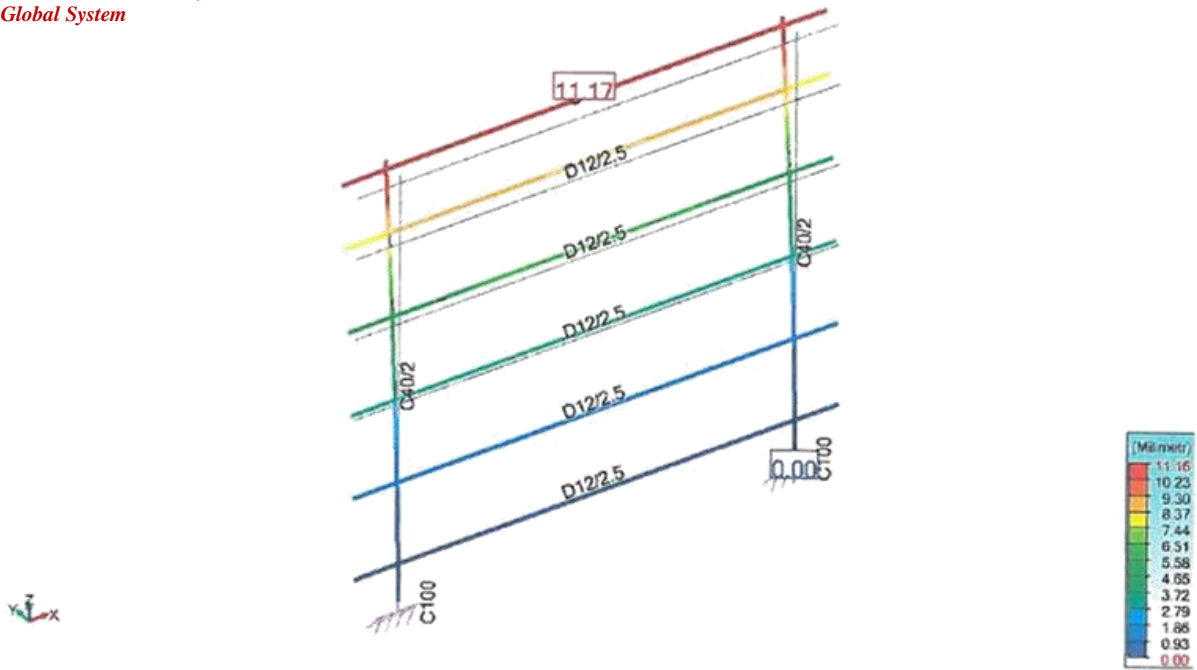
3) **Shifts and Deformations**

User´s View
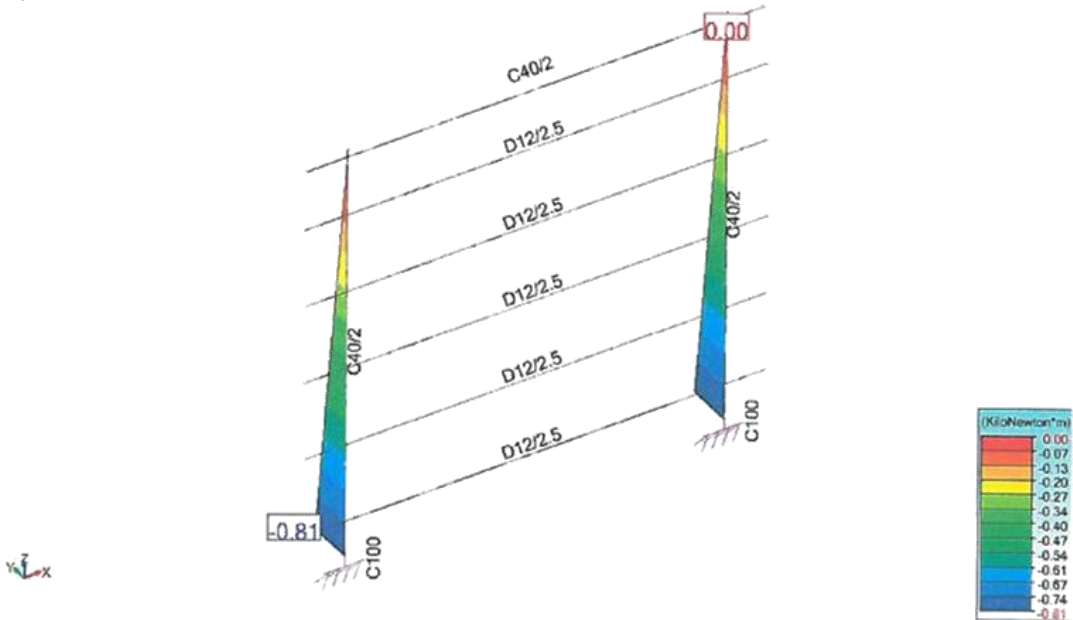*Calculation: D1 - 108 (Graphic cover –*
MaxAbs
Linear element: Sv
Local axes

4) **Stress**

User´s View
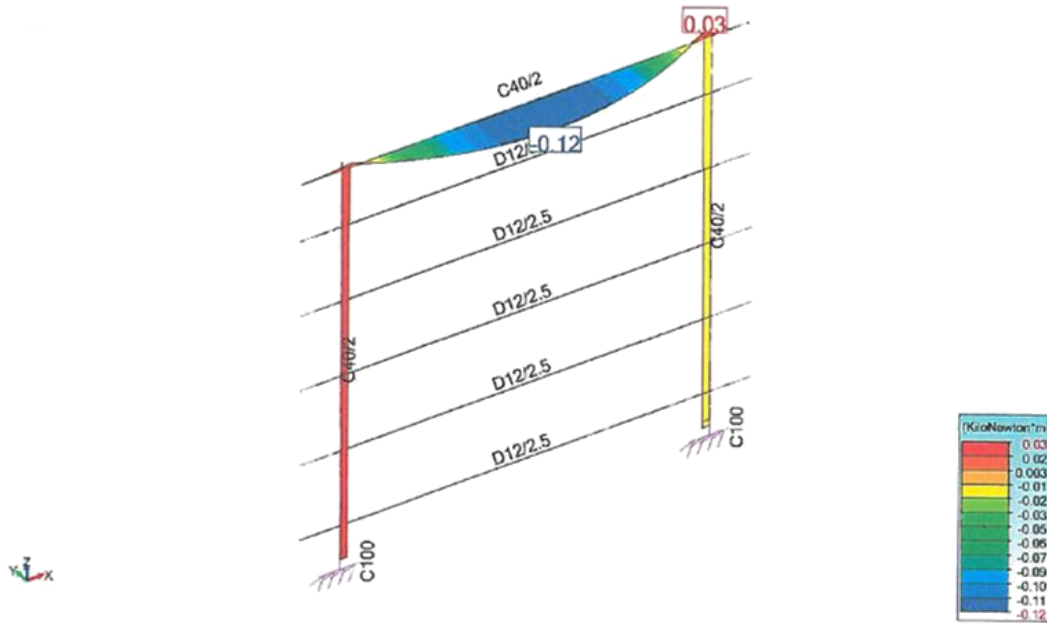*Calculation: D1 - 108 (Graphic cover –*
MaxAbs
Linear element: FY
Global System

5) **Forces on elements - Fy**

User´s View
Calculation: D1 - 108 (Graphic cover –
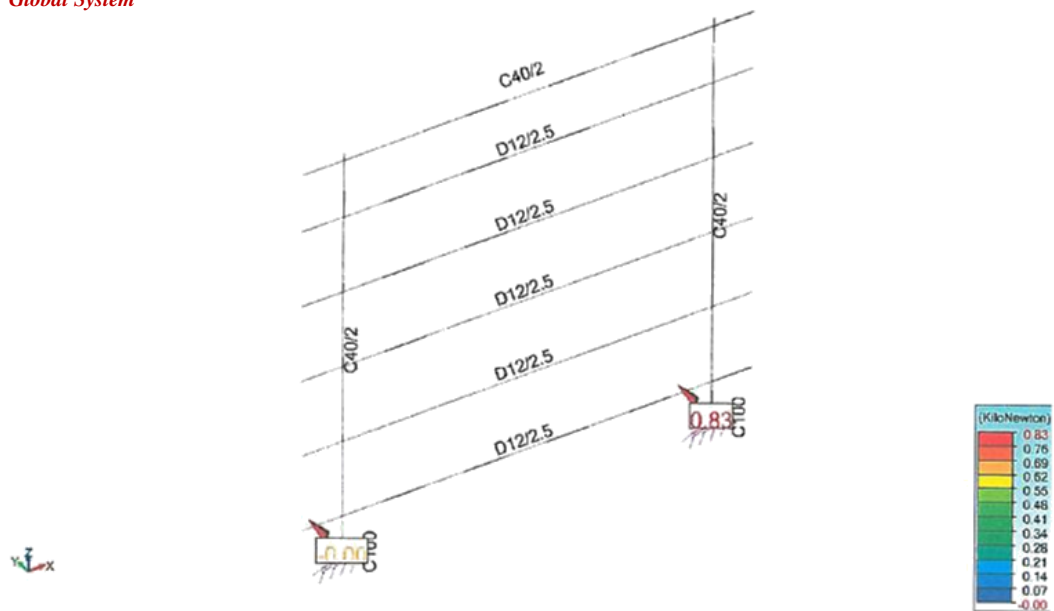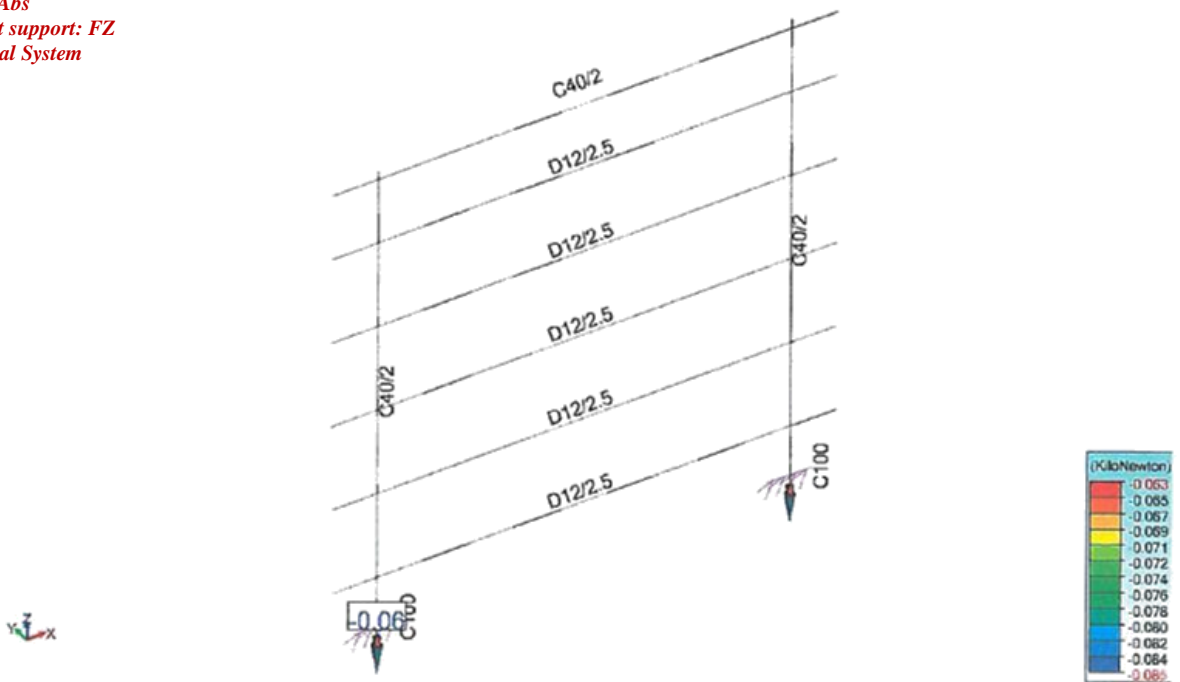*MaxAbs*
Point support: MX
Global System

6) **Forces on elements - Mx**
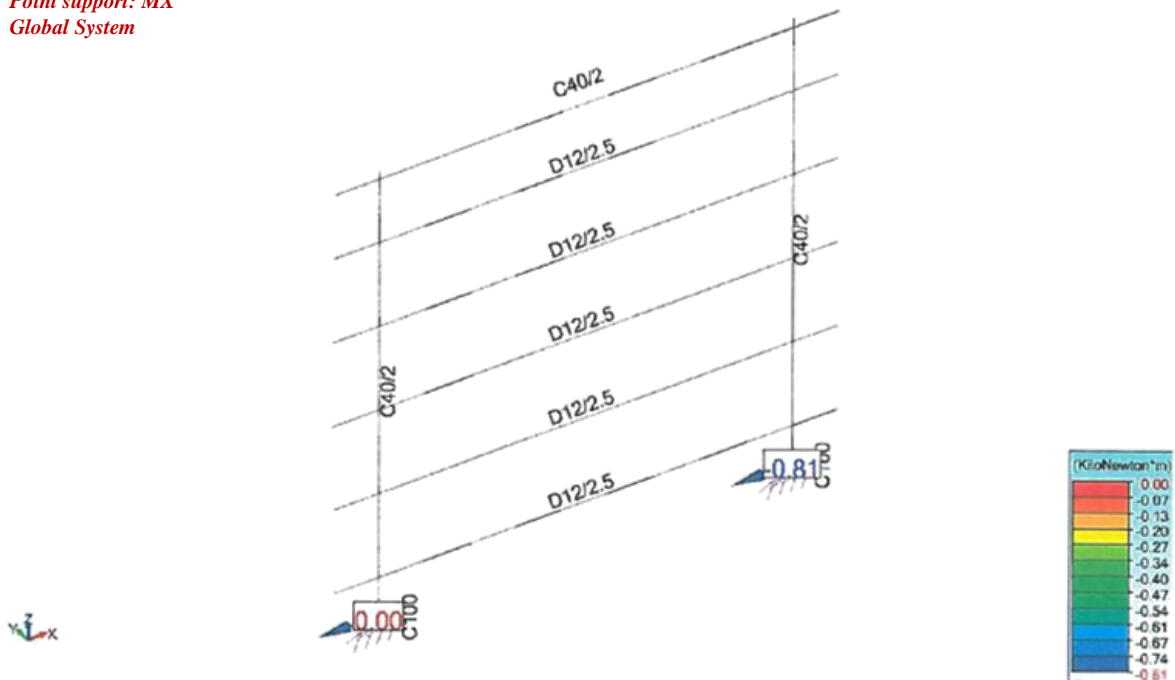
7) Forces on elements - Mz

8) Reactions - Fy

User´s View
Calculation: D1 - 108 (Graphic cover –
MaxAbs
Point support: FZ
Global System

9) *Reactions - Fz*

User´s View
Calculation: D1 - 108 (Graphic cover –
MaxAbs
Point support: MX
Global System

10) *Reactions - Mx*

USED LITERATURE:

[1]   STN EN 1990 Eurocode: Design Principles

[2]   STN EN 1991 Eurocode 1: Action on Structures

[3]   STN EN 1993 Eurocode 3: Design of Steel Structures

[4]   HARVANČÍK-PEKAROVIČ: STAVEBNÁ MECHANIKA, SNTL/ALFA, BRATISLAVA 1981 / *STRUCTURAL MECHANICS*

[5]   SOBOTA: STAVEBNÁ MECHANIKA, SNTL/ALFA, PRAHA 1980 / *STRUCTURAL MECHANICS*

[6]   STN 73 14 01   DESIGN OF STEEL STRUCTURES

[7]   STATIC PROGRAMS IN COMPUTERS: ADVANCE DESIGN

[8]   STN 73 00 35   LOAD ACTION ON BUILDING STRUCTURES

[9]   HOŘEJŠÍ-ŠAFKA: STATICKÉ TABUĽKY-TP51 / *STATICS TABLES*, SNTL/ALFA PRAHA 1987

[10]   INTERNET