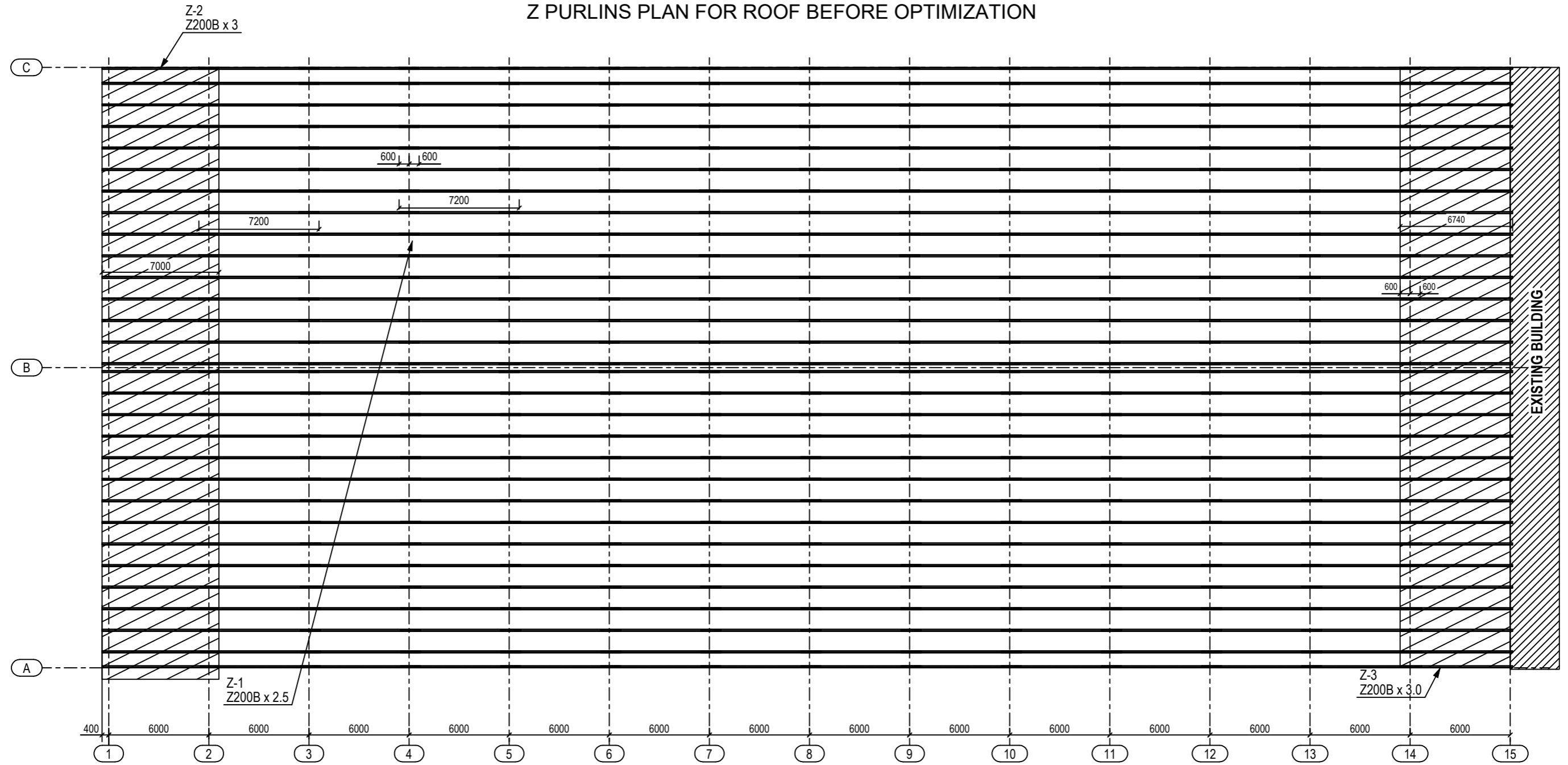


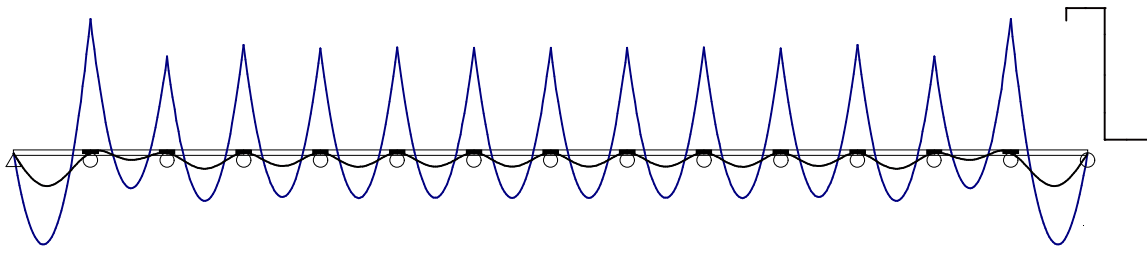
## Z PURLINS PLAN FOR ROOF BEFORE OPTIMIZATION



Purlins designations:

Z200B x 2.5 S350GD + Z	2764,80 m	19160,06 kg
Z200B x 3.0 S350GD + Z	439,68 m	3653,74 kg
<b>TOTAL</b>	<b>3204,48 m</b>	<b>22813,80 kg</b>

LOADS FOR ROOF:  
 Dead load - 0.60 kN/m<sup>2</sup>  
 Basic snow load - 1.75 kN/m<sup>2</sup>  
 Wind velocity - 21 m/s  
 Terrain type II



**Z-beam**

General EN 1990 Eurocode: Basis of structural design  
 Snow loads EN 1991-1-3: + /A1 :2015 Eurocode 1: Action on structures - Part 1-3: General actions - Snow loads  
 Wind actions EN 1991-1-4: Eurocode 1: Action on structures - Part 1-4: General actions - Wind actions  
 Sheeting EN 1993-1-3: Eurocode 3: Design of steel structures - Part 1-3: General rules  
 - Supplementary rules for cold-formed members and sheeting

**I n p u t** Z-beam 200-60-69 c/c beam 1300 factor 1,1

Project .....	Screws in the webtop Narrow trough down														
Building ...	length 84000	width 36000	slope 3,58	column height 9000	gravity load 0,6										
Support no. ...	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Span	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Thickness ...	2,50	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,50	mm
Yield stress ..	350	350	350	350	350	350	350	350	350	350	350	350	350	350	MPa
Inertia	5,3E+6	4,3E+6	4,3E+6	4,3E+6	4,3E+6	4,3E+6	4,3E+6	4,3E+6	4,3E+6	4,3E+6	4,3E+6	4,3E+6	4,3E+6	4,3E+6	mm <sup>4</sup>
Overlap/screws left	600/2	600/2	600/2	600/2	600/2	600/2	600/2	600/2	600/2	600/2	600/2	600/2	600/2	600/2	mm
Overlap/screws right	600/2	600/2	600/2	600/2	600/2	600/2	600/2	600/2	600/2	600/2	600/2	600/2	600/2	600/2	mm

Distributed load	4,56	4,54	4,54	4,54	4,54	4,54	4,54	4,54	4,54	4,54	4,54	4,54	4,54	4,54	4,56	kN/m
Dead load and distributed suspended load	0,60 kN/m <sup>2</sup> ( $\gamma_Q = 1,50, \gamma_G = 1,35, \xi = 0,85$ )															
Snow basic value	1,75	shape factor	0,80	shape factor	0,80											
Wind terrain	II	reference wind	21	velocity pressure	0,67	shape factor	0,71 / -0,80									
Screws dimension .....	12,0															

**Result**

Support no. ....	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
M at support	-18,4	-13,2	-14,8	-14,3	-14,5	-14,4	-14,4	-14,4	-14,5	-14,3	-14,8	-13,2	-18,4	kNm	
Moment in span .	12,3	4,700	6,421	5,877	6,037	5,989	6,003	6,003	5,989	6,037	5,877	6,421	4,700	12,3	kNm
Support react.	10,61	31,20	26,12	27,57	27,13	27,26	27,22	27,24	27,22	27,26	27,13	27,57	26,12	31,20	10,61
Deflection	16,8	3,26	7,82	6,42	6,84	6,72	6,75	6,75	6,72	6,84	6,42	7,82	3,26	16,8	mm $\psi=1$ (snow)
Dist. load SLS	2,35	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,34	2,35
M at overlap, left	-9,15	-6,40	-7,27	-7,01	-7,09	-7,07	-7,08	-7,08	-7,06	-7,10	-6,98	-7,38	-6,04	-10,50	kNm
M overlap, right ..	-10,50	-6,04	-7,38	-6,98	-7,10	-7,06	-7,08	-7,07	-7,09	-7,01	-7,27	-6,40	-9,15	kNm	
Force in screws, left	12,85	11,11	12,29	11,94	12,05	12,01	12,03	12,01	12,05	11,93	12,34	10,96	17,76	kN	
Force in screws, right	17,76	10,96	12,34	11,93	12,05	12,01	12,03	12,01	12,05	11,94	12,29	11,11	12,85	kN	

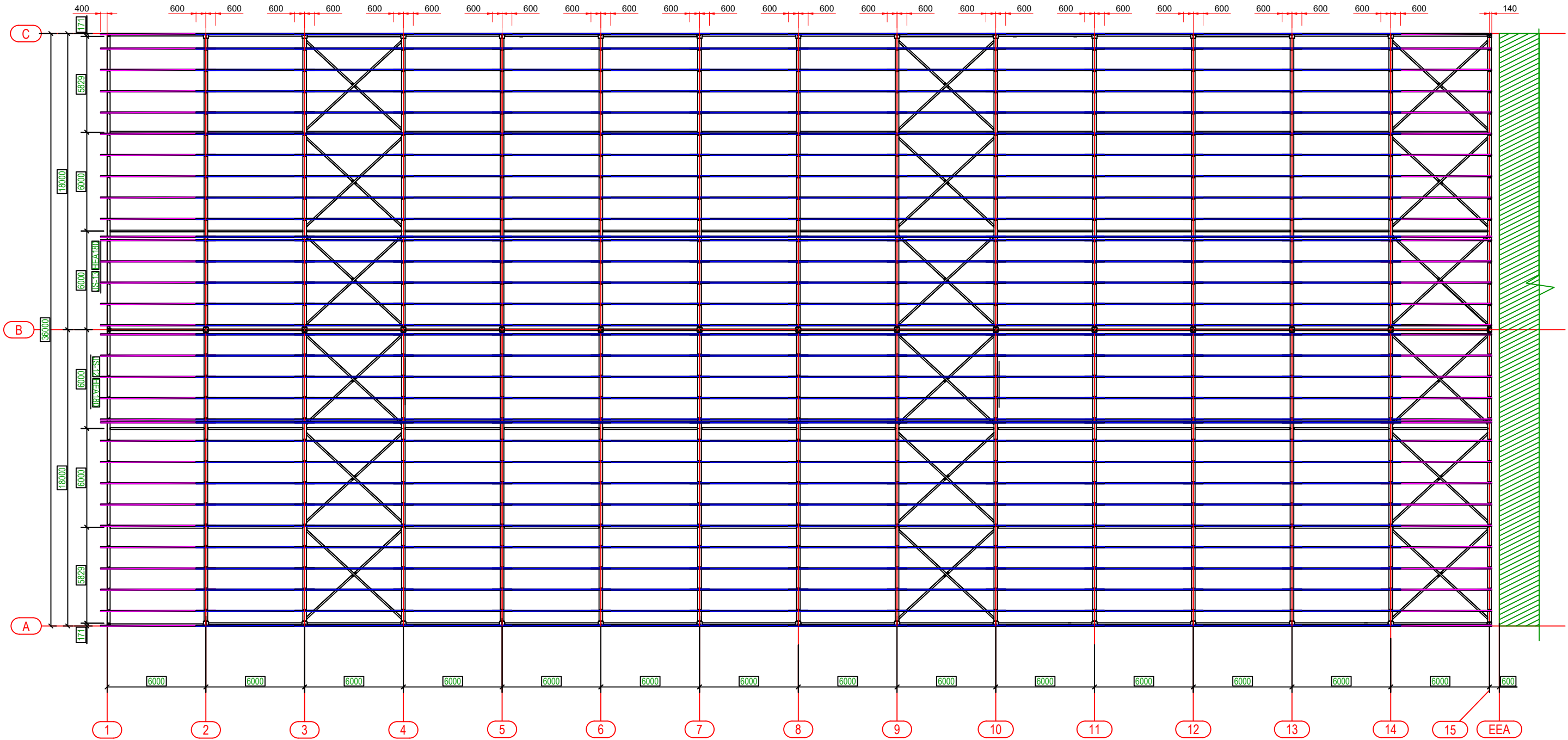
**Utilization**

Consequence Class 2 $\gamma_d = 1,00$ $\gamma_{M1} = 1,00$																
Support no. .	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	M <sub>Rk</sub> etc
Moment in field ..	0,717	0,345	0,471	0,432	0,443	0,440	0,441	0,441	0,440	0,443	0,432	0,471	0,345	0,717	13,62	17,22
M at support	0,930	0,822	0,885	0,866	0,872	0,870	0,871	0,870	0,872	0,866	0,885	0,822	0,930	27,82		31,45
M+V at left overlap	0,522	0,460	0,523	0,504	0,510	0,508	0,509	0,508	0,510	0,502	0,531	0,435	0,755			
M+V at right overlap	0,755	0,435	0,531	0,502	0,510	0,508	0,509	0,508	0,510	0,504	0,523	0,460	0,522			
M+V support .....	0,584	0,476	0,531	0,515	0,520	0,518	0,519	0,518	0,520	0,515	0,531	0,476	0,584			45,7 kN
Screws at left overlap	0,325	0,281	0,311	0,302	0,305	0,304	0,304	0,304	0,305	0,302	0,312	0,277	0,450			19,76 kN 12
Screws at right overlap	0,450	0,277	0,312	0,302	0,305	0,304	0,304	0,304	0,305	0,302	0,311	0,281	0,325			19,76 kN 12
Screws at supp	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	24,80 kN 12
Deflection	0,573	0,112	0,268	0,220	0,234	0,230	0,231	0,231	0,230	0,234	0,220	0,268	0,112	0,573	L/200	

Max utilization, strength 0,930 OK deflection 0,573

- 1 - Dead load
- 2 - Snow load
- 3 - Optimized thickness
- 4 - Utilization check

## Z PURLINS PLAN FOR ROOF AFTER OPTIMIZATION



Profilu apzīmējumi:

Z200x2.0	Z200x2.5 S350GD + Z	2764,80 m	15510,53 kg
Z200x2.5	Z200x3.0 S350GD + Z	439,68 m	3046,98 kg
TOTAL		3204,48 m	18557,51 kg

Z purlins length						
No.	Description	Thick.	Length	Qty	Material	Coating
1B	Z200	2.5	7200	384	S350GD+z	Zn
2B	Z200	3.00	7000	32	S350GD+z	Zn
3B	Z200	3.00	6740	32	S350GD+z	Zn
			Total:	3204.48 m	448	