

**Church of the Virgin At Gelati Monastery
Plan of the arrangement of the metal belt on
the bottom point of the drum**

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Tblisi 2015

Description

The suggested project had been designed on the bases of architectural measurements. It proposes the engineering-technical solution for the arrangement of metal ring on the lowest point of the drum of the church of the Virgin at Gelati Monastery. The solutions had been elaborated on the bases of the calculations of the spatial model of the church done using the “LIRAS” software. The graphic documentation and calculations are attached and represent the integral part of the project.

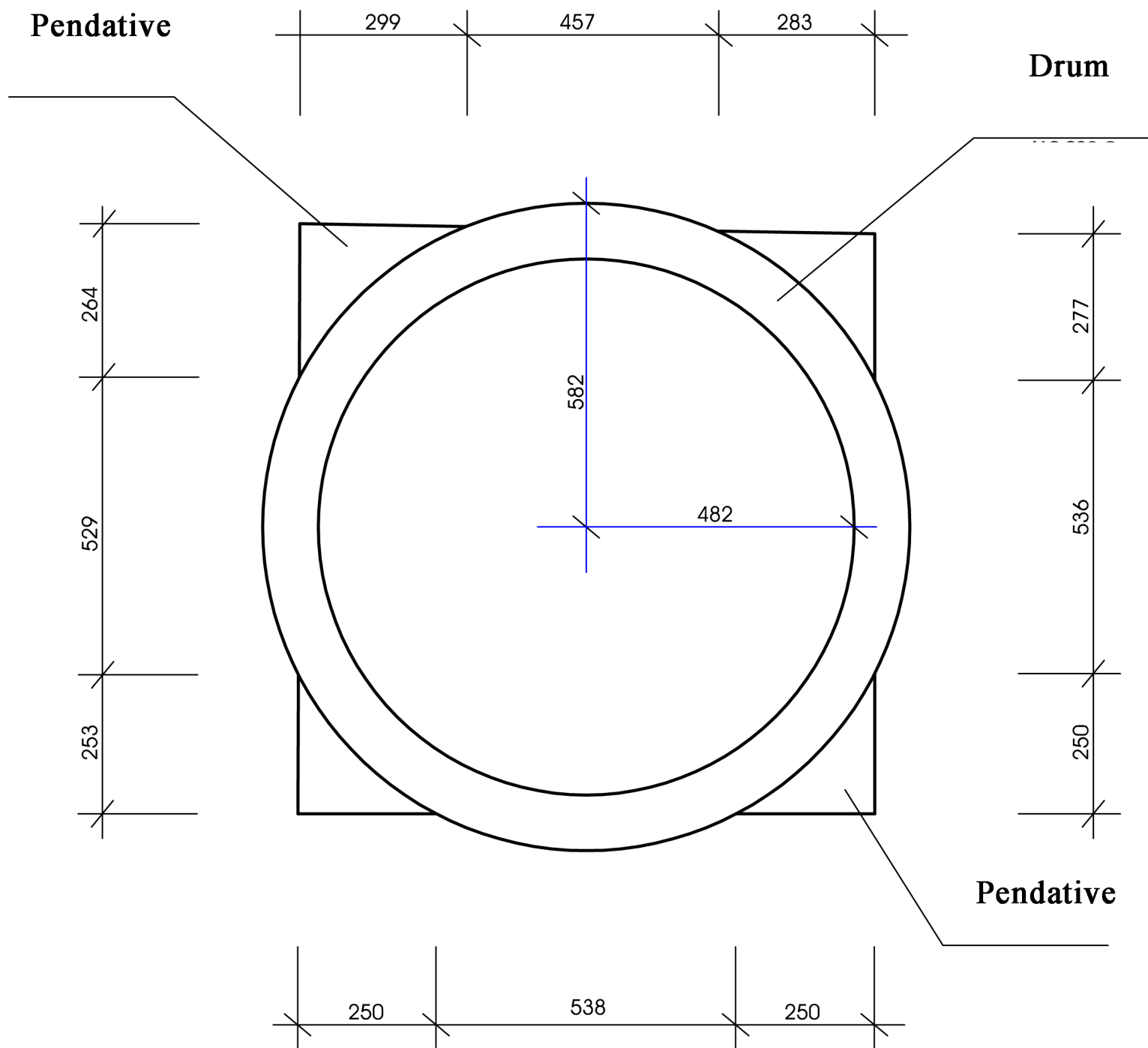
The works must be implemented in the following sequence: On the first stage the anchors will be installed by the lime mortar in the drill holes on the lowest point of the drum. After the hardening of the lime mortar (minimum 14 days) the metal ring will be attached to the anchors. The ring itself will be attached to the pendatives with metal angle bars and analogical anchors. Metal angle bars will be arranged on the pendatives by lime mortar.

All angle bars used in the structure are from stainless metal.

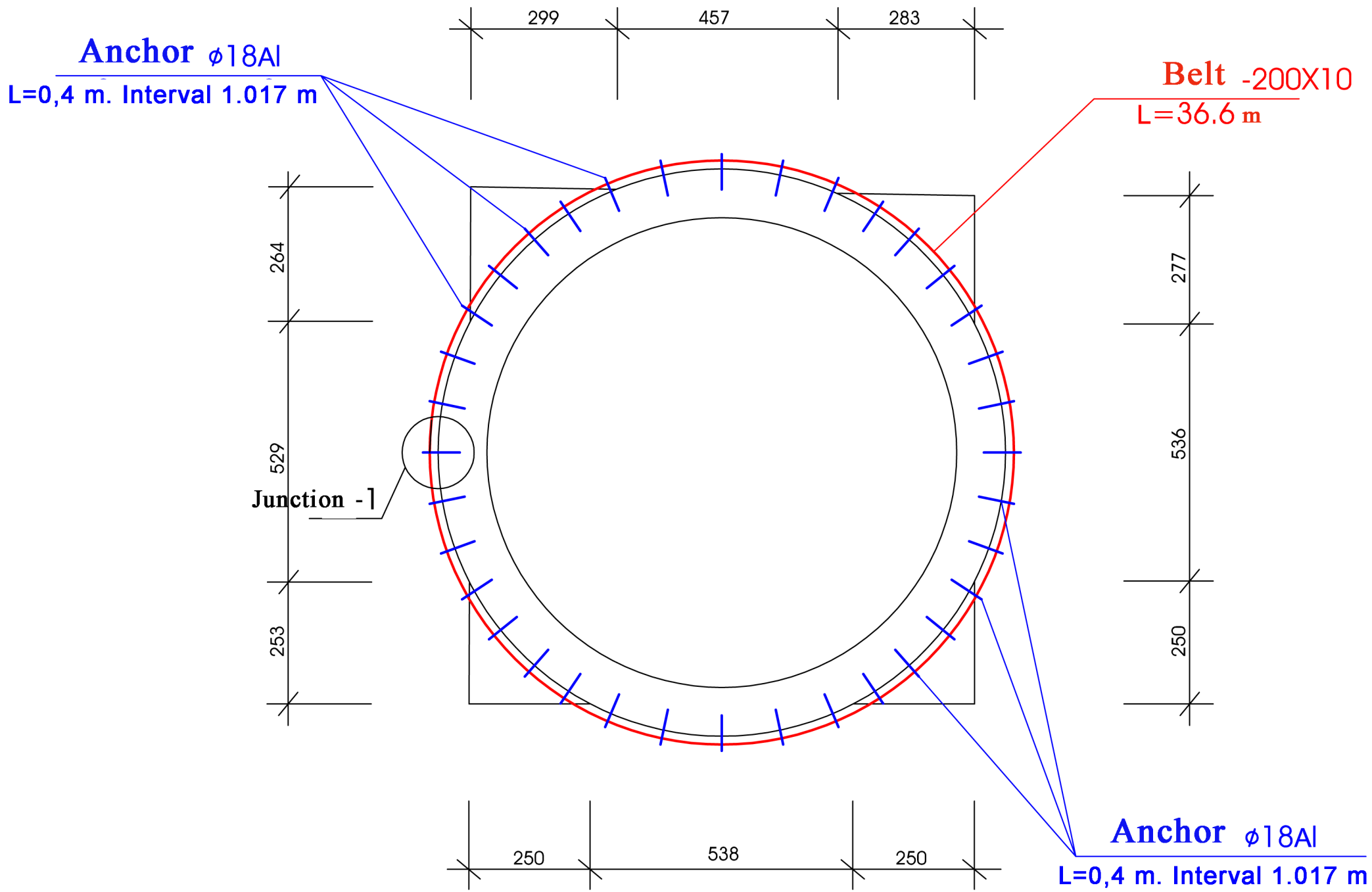
Materials

1. Metal belt 200x10 - L=40.0 m
2. Steel reinforcement (armature) Ø 18AI – 23 m.
3. Drill holes 4cm L=0.4m – 56 holes
4. Angle bars 125x125x10 – 5 m
5. Lime mortar -0.8m³

Plan of Drum and Pendants

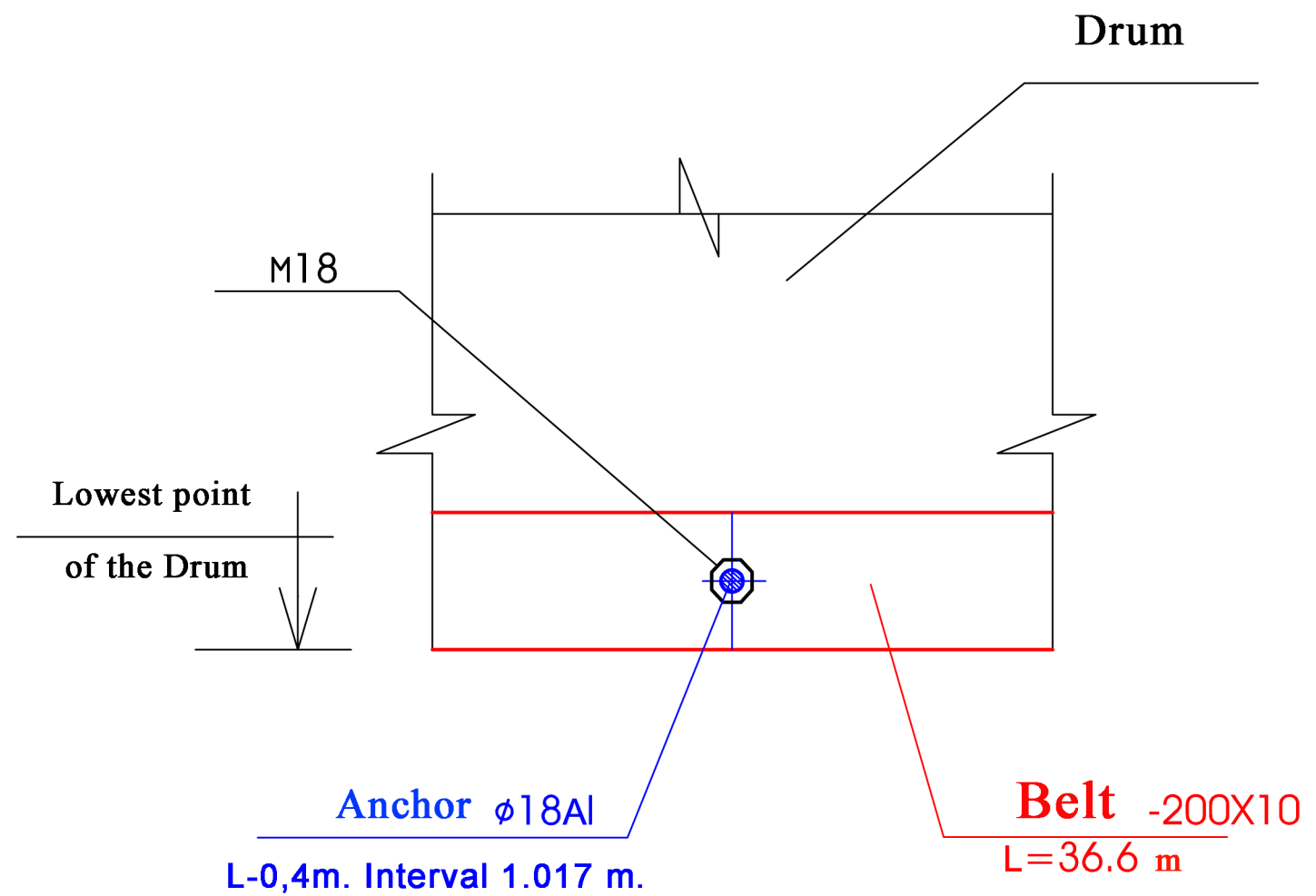
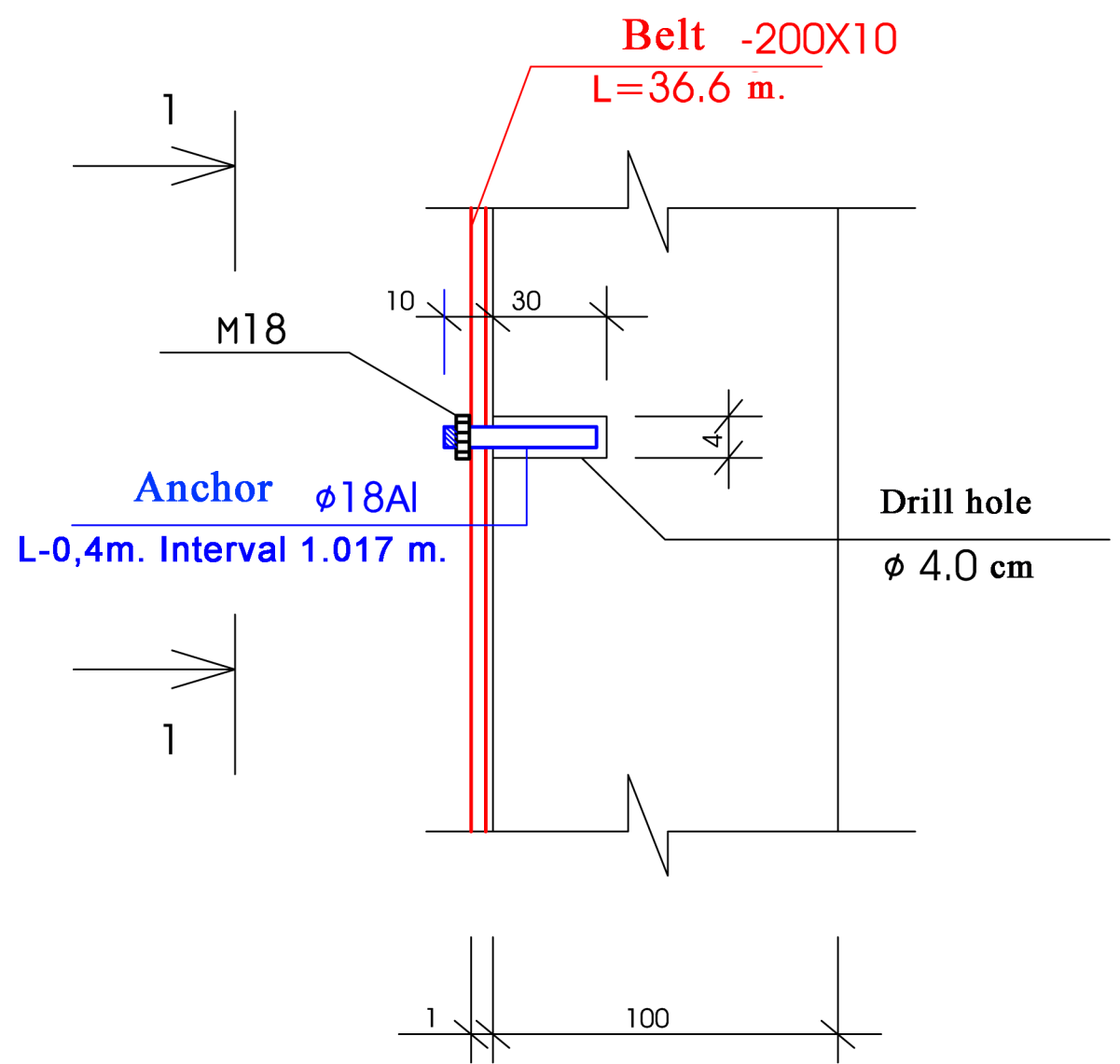


Plan of the Belt on the Lower point of the Drum



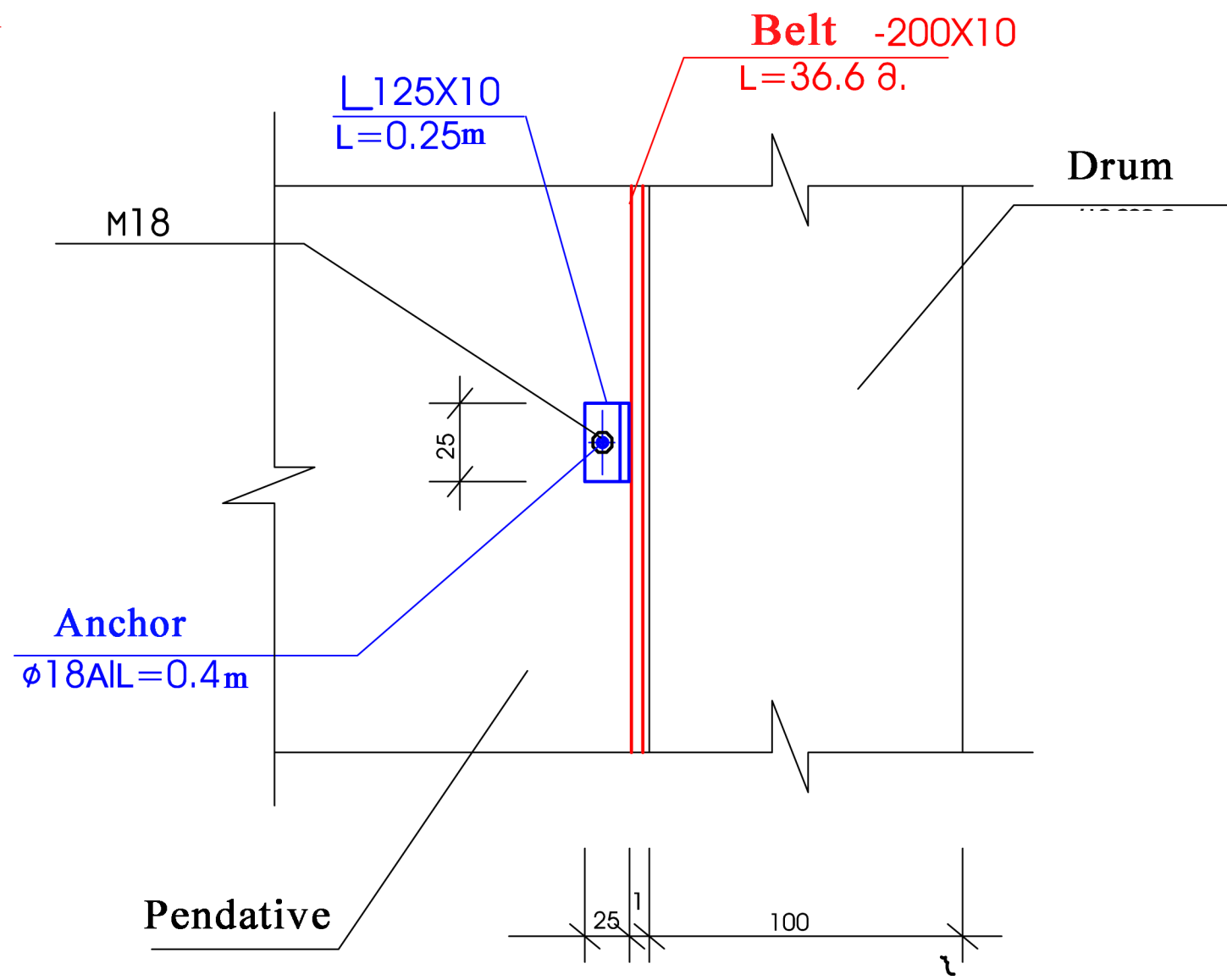
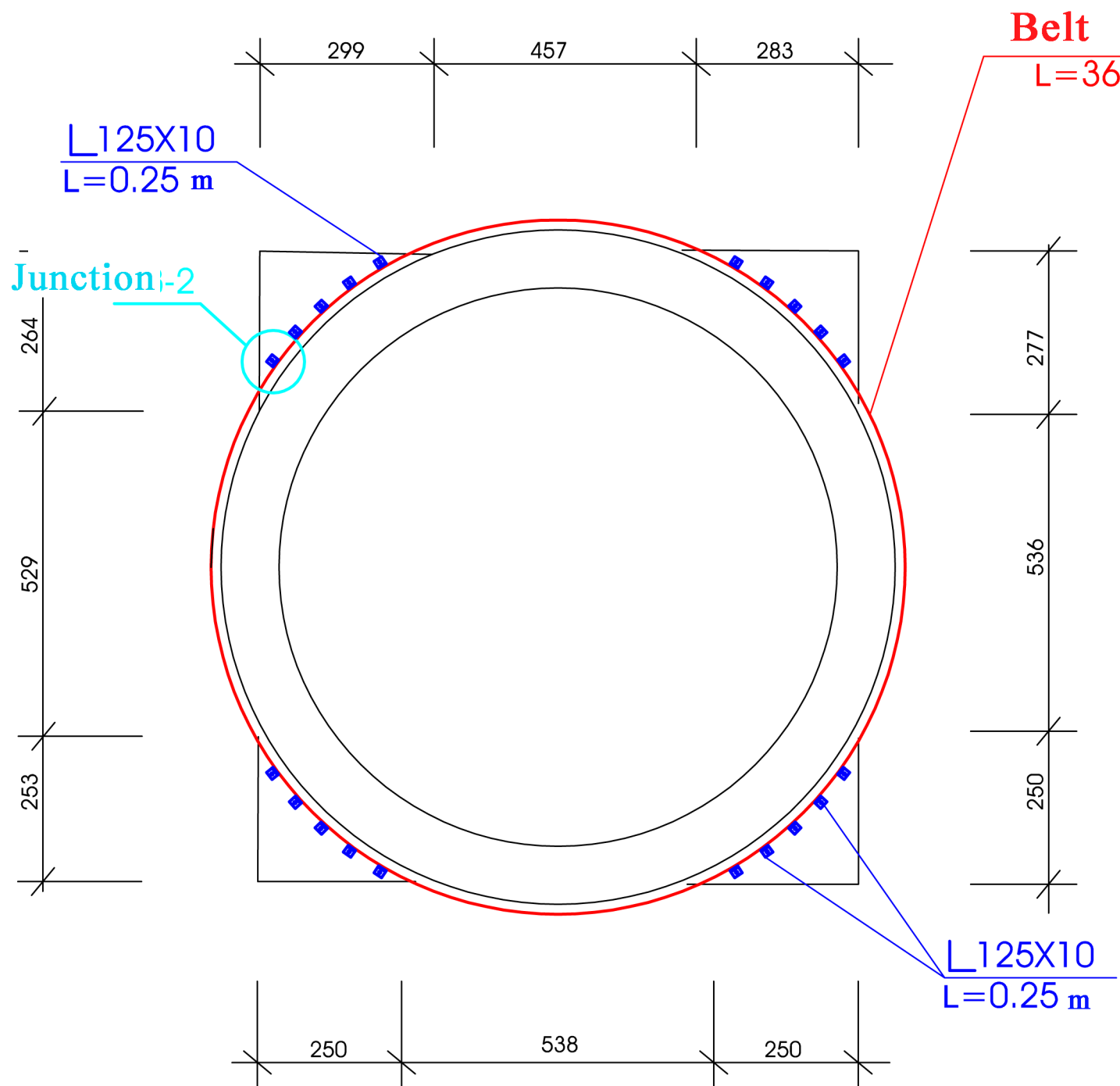
Junction -- 1

1 ---- 1

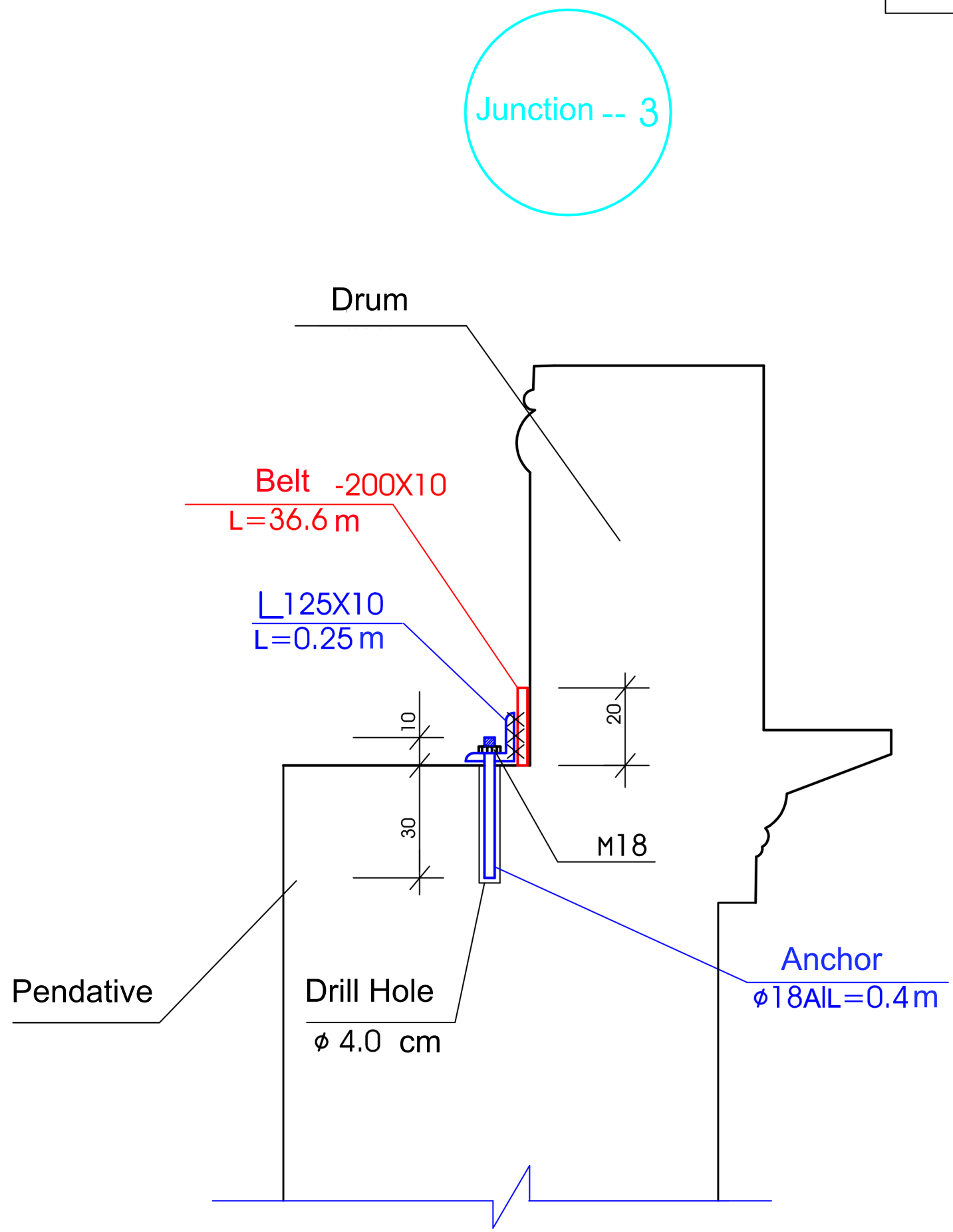
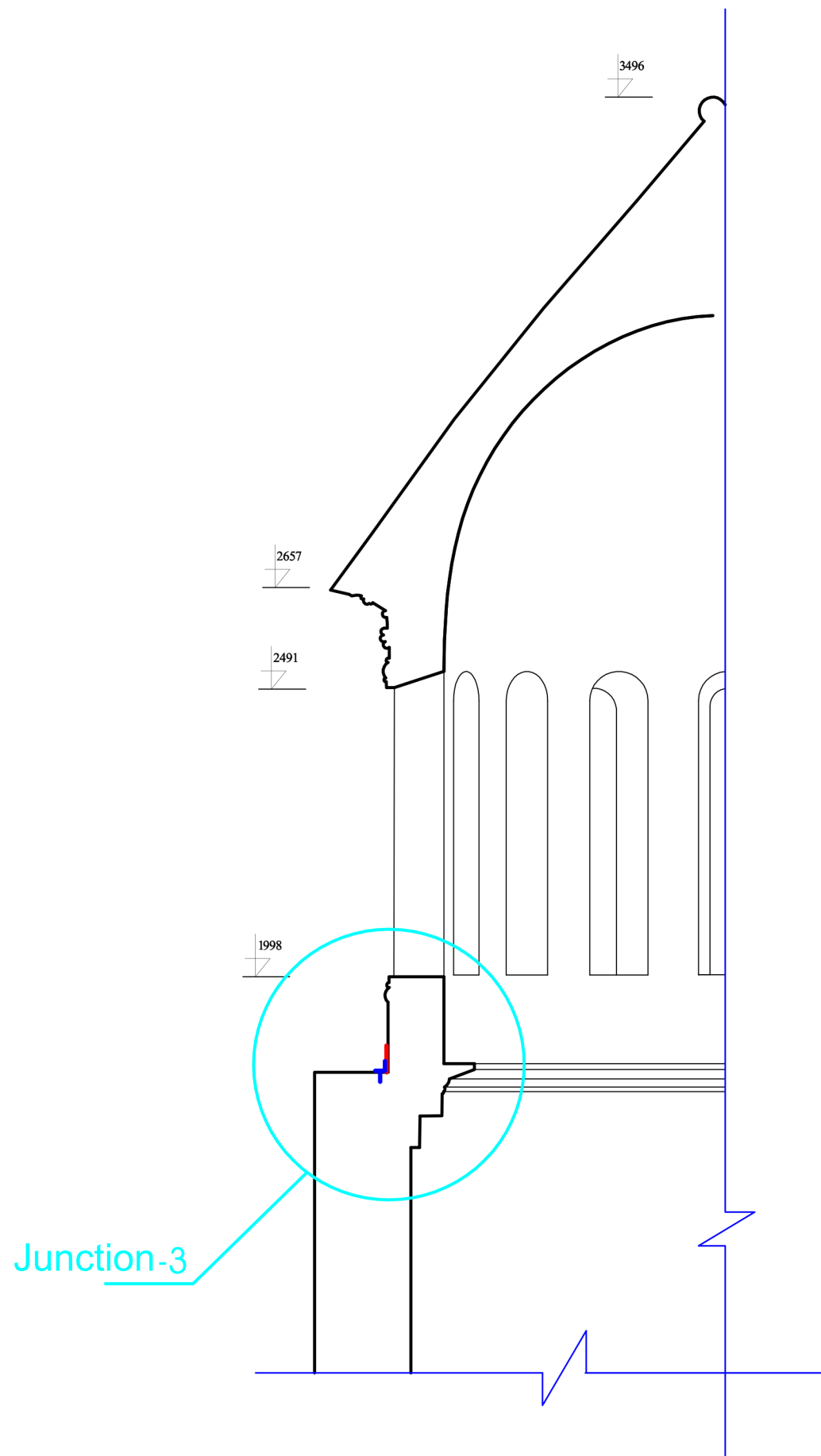


Plan of the Attachment of the Belt to the Pendatives

Junction -- 2



Attachment of the belt to the pendatives Cross Section



Church of the Virgin At Gelati Monastery

Scenario	Period of oscillation sec.	Skew from seismic force mm	Normal and tangent seismic tensions on the drum. kg/cm ²					
			Compression			Stretching		
			N _X	N _Y	T _{XY}	N _X	N _Y	T _{XY}
I before reinforcement	T _{1X} =0.4	f _{1X} = 21.2	3.9	9.4	5.0	4.7	10.6	3.9
	T _{2X} =0.28	f _{2X} = 7.3	2.2	5.7	2.2	2.4	5.3	2.6
	T _{3X} =0.17	f _{3X} = 1.4	0.6	0.7	0.2	0.4	0.5	0.4
	T _{1Y} =0.44	f _{1Y} = 22.5	2.7	9.9	4.0	2.7	10.0	3.7
	T _{2Y} =0.3	f _{2Y} = 8.7	2.5	6.5	1.4	2.5	6.5	2.5
	T _{3Y} =0.18	f _{3Y} =1.9	0.6	1.2	0.6	0.7	1.3	0.4
II after the reinforcement of the drum	T _{1X} =0.37	f _{1X} =18.7	5.3	8.9	5.0	4.6	10.1	3.8
	T _{2X} =0.26	f _{2X} =6.2	5.8	5.6	2.4	4.8	4.9	2.7
	T _{3X} =0.16	f _{3X} =1.36	0.9	0.8	0.5	1.3	0.5	0.4
	T _{1Y} =0.42	f _{1Y} =20.7	3.0	9.5	3.9	2.7	9.5	3.9
	T _{2Y} =0.27	f _{2Y} =7.3	5.5	6.4	1.4	5.6	6.4	2.5
	T _{3Y} =0.17	f _{3Y} =0.9	1.0	1.1	0.6	0.8	0.9	0.4
III after the reinforcement of the drum and attachment of wood belt between the drum columns	T _{1X} =0.37	f _{1X} =18.7	5.3	8.9	5.0	4.6	10.1	3.8
	T _{2X} =0.26	f _{2X} =6.2	5.8	5.6	2.4	4.8	4.9	2.7
	T _{3X} =0.16	f _{3X} =1.36	0.9	0.8	0.5	1.3	0.5	0.4
	T _{1Y} =0.42	f _{1Y} =20.7	3.0	9.5	3.9	2.7	9.5	3.9
	T _{2Y} =0.27	f _{2Y} =7.3	5.5	6.4	1.4	5.6	6.4	2.5
	T _{3Y} =0.17	f _{3Y} =0.8	1.0	1.1	0.6	0.8	0.9	0.4