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(+, 10, 5, 5), (+, 10, 5, 5), (+, 8, 4.5, 4.5), (10, 5, 5), [+]

ARCHITECTURE PROPOSED FOR NEW CHURCH IN FORTRESS MODLIN

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ABSTRACT: In LSCE 2009 book was presented the paper by the same authors, on conception of the project of the church which is designed for historical Fortress Modlin. It is located near Nowy Dwór Mazowiecki, Poland. The attention was there focused on nonconventional structures foreseen for covering particular rooms in this object. There are planned four ribbed masonry domes for side chapels and towers, cylindrical - circular double-layer space bar structures for main navy and for two side navies, and UNIDOM type dome for large skylight located in point of crossing the axes of symmetry of main navy and transept (side chapels). The presented project is on very early stage - preliminary accepted for further works.

Unfortunately on 10 February, 2012 at app. 3 am in early morning, the first of the present authors passed away. But leave almost finished sketches of the church architecture, shown in fragments located on 25 His drawings. The last His drawings were finished on 9 hours before His death … These architectural drawings are completed by the second author, and in actual form presented below.

Keywords: architecture, church, Fortress Modlin, project, masonry domes, UNIDOM, structure, space bar structures

1. INTRODUCTION

The project of the church for stronghold named Fortress Modlin, was ordered by parish Cezary Siemiński in December, 2008. The designing assumptions were very simple. It will be located inside area of the stronghold which belongs to historical objects. As possible localisation were pointed two places, with certain preference the neighbourhood of actual timber church, as being the property of parish in stronghold.

Next, appears next proposals for location the designed church. The matter was consulted with monuments conservator. Up to the moment location of the new church is not settled. It not permits to finish definitely foundation of the object.

The global conception of the church was formed by J.B. Obrębski, but with full consultation and acceptation by Konrad Bartłomiej Obrębski. He was accepting application of some new structures, and to exhibit - to show them for observers. In this paper is specially turned attention on ideas, which were introduced to project by Konrad.

As always, project of the church located in historical Fortress Modlin is an occasion for application of innovative structural solutions. As the most important was taken assumption, that new object should have the architecture in style similar to whole stronghold. So, in project are foreseen elevations finished in bricks, domes, arches and vaults. Moreover, are applied: four reinforced masonry-ribbed domes, five double-layer space bar structures and relatively large skylight – double-layer bar dome, located over central point of the church. Determination of proportions for whole object and its structural elements, theirs locations in whole object, dimensions and at last calculations are aided by computer Refs 6, 8.

The successive steps of designing process of the church were discussed in some previous papers, too Refs 1-9. There special attention was turned on unconventional structures applied in the church and on its calculation. All previous papers have presented the first sketches of the church shape, proposed by J.B. Obrębski. Now first time is shown full architecture.

After such recognition, was time on detailed solution of appearance of the object. It concern as well its external as internal details, including sacral functions and elements. So, present paper show much matured drawings, each located on standard formats – applied in technical projects.

The drawings prepared by Konrad are located on formats A1 and the other drawings with structural elements are presented on formats A2, A3 and A4. As it is well visible on presented drawings, especially of the structural character, the works over the project are continued.

2. ARCHITECTURAL DRAWINGS

As it was mentioned, Konrad leave 25 drawings in electronic AutoCAD version. The all these drawings are denoted as PB-A-XX with number XX. The horizontal cross-sections have numbers 01 to 10. The transversal vertical sections have numbers from 20 up to 24 and letter denotation AA, BB, CC, DD and EE (counted from facade to presbytery). The longitudinal vertical sections (from left to right side of church) have numbers 25 to 28 (noted on the drawings as 1-1, 2-2, 3-3 and 4-4. Next, four elevations are shown on the drawings with numbers 30 up to 33. Additionally, the set of applied typical windows, specially elaborated for this church, are shown on the drawing PB-A-40. At last, in separate file, was found drawing with study of three proposals of bricks arrangement - disposition on church walls. The computer has noted that last drawing over which Konrad was working was North Elevation – PB-A-30, closed on 9.02.2012 (Thursday) at 17:55, approximately 9 hours before His death.

Konrad on His drawings willingly has used many layers and distinguish particular structural elements by colours.

To more important Konrad's decisions belongs:
- consent on application of structural bar vaults and large UNIDOM

type bar dome as covering system for the church,
- exposition of bar structures in interior of the church,
- largeness of circular rosette located in frontal facade,
- conception to apply sculptures of holly peoples as topping parts of eight columns - simultaneously ventilation chimneys,
- shape of windows, cross-stations, altar and many details.

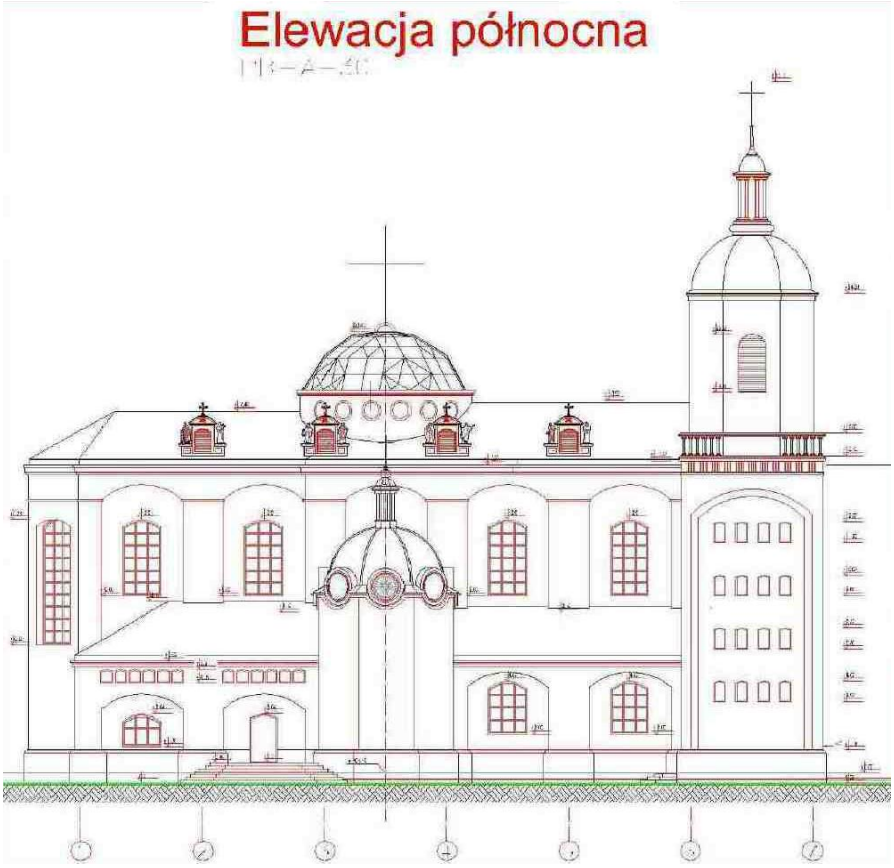

Fig. 1. North elevation

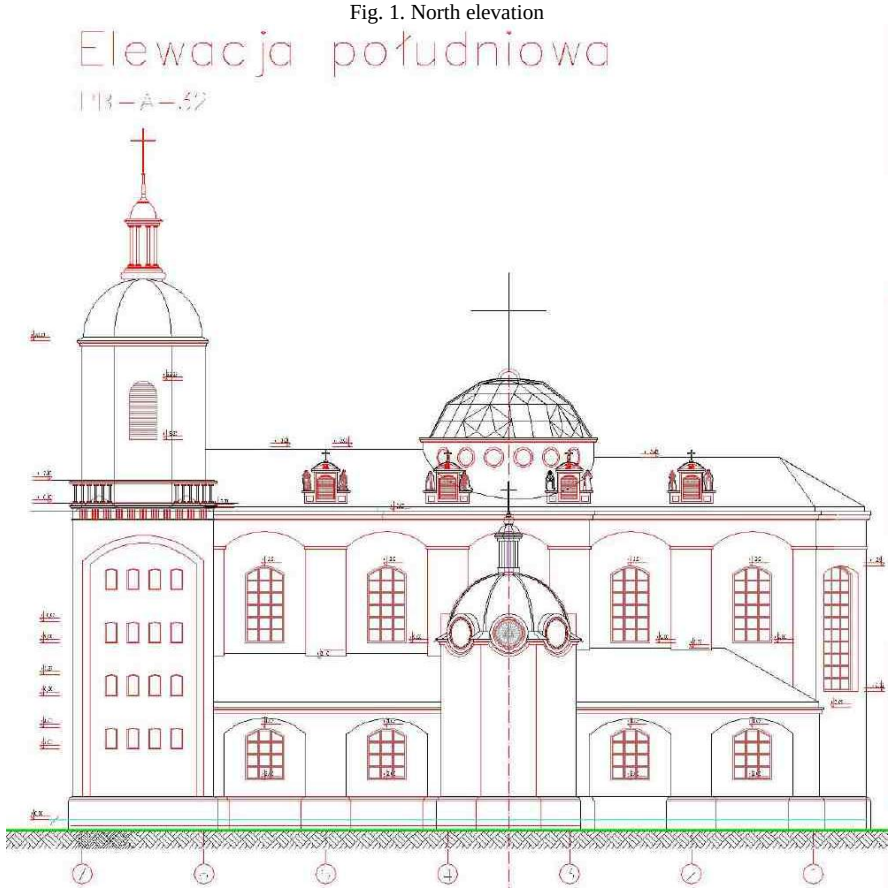

Fig. 2. South elevation

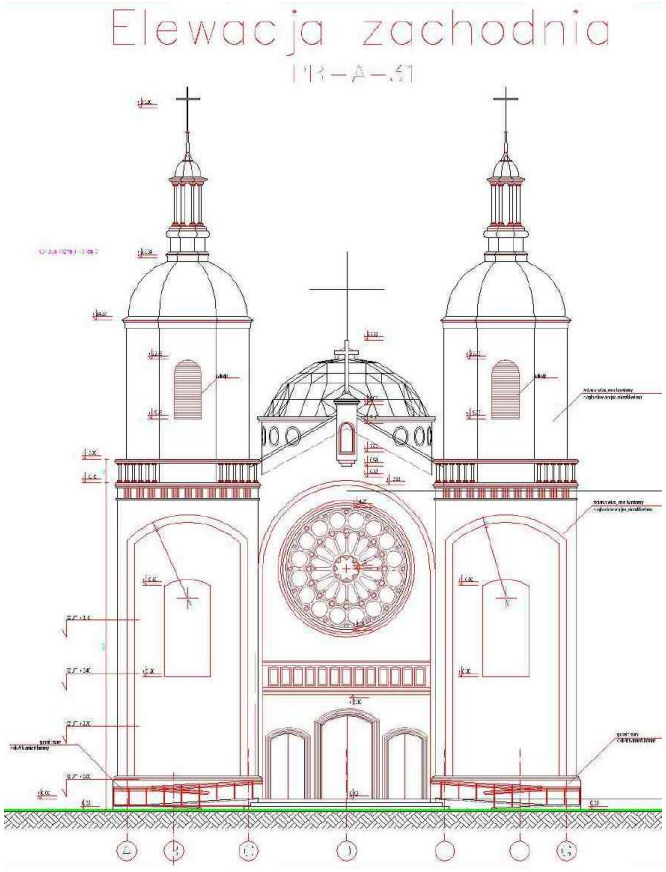

Fig. 3. West elevation - front view.

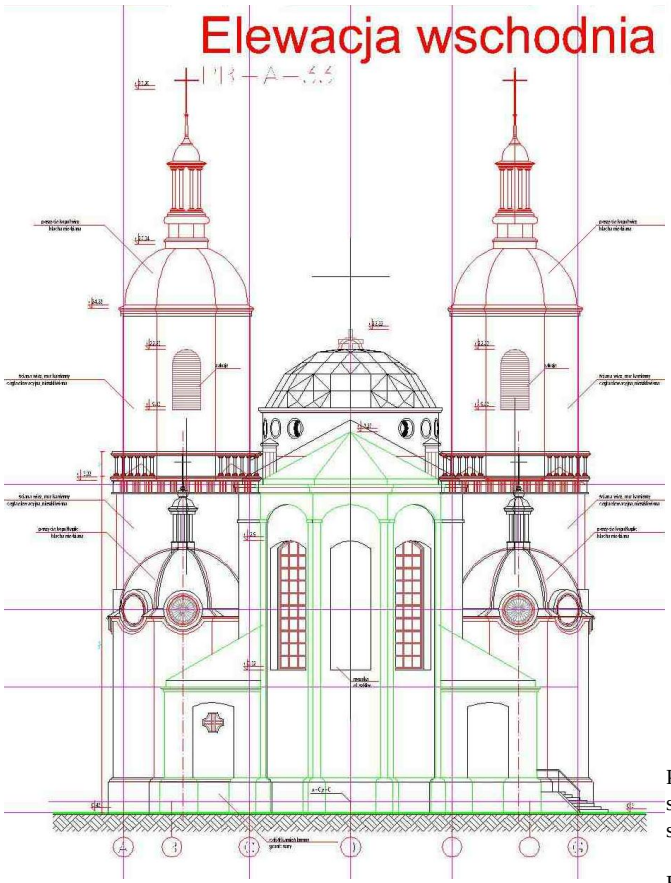

Fig. 4. East elevation

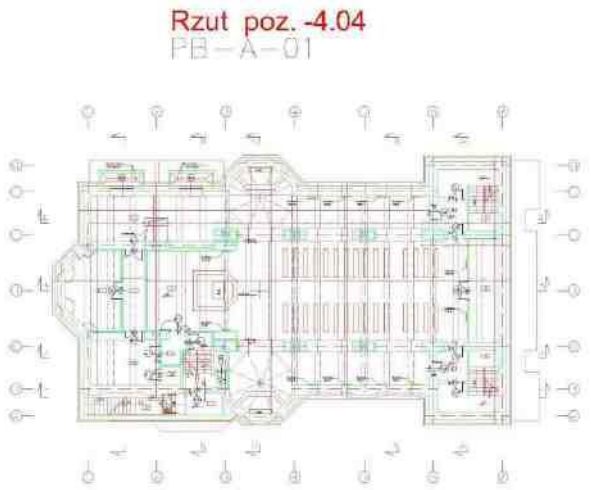

Fig. 5. Plan of underground level – basement.

Fig. 6. Plan of ground level.

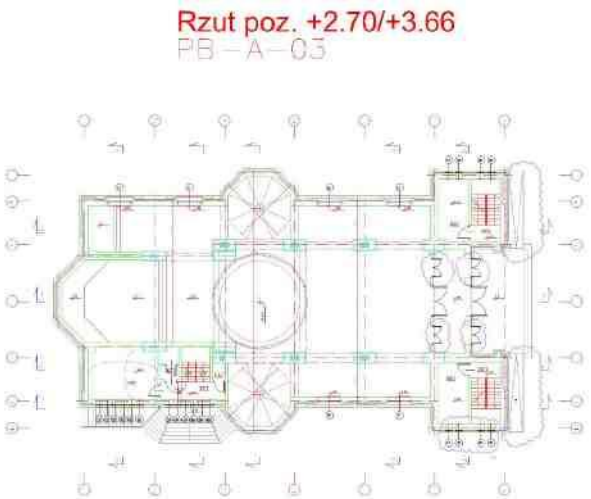

Fig. 7. Plan – horizontal cross-section - levels +2.70/ + 3.66m.

Presented here drawings have almost last shape, coordinated with structural system of the building. Some details will be corrected and some slight details can be still modified.

Especially, are expected strong modifications of the foundation system, which after geotechnical investigations will be definitely proposed. We shell remember, that this terrain has many underground military

fortifications, which actually are even not in inventory of the Fortress.

Still some parts of the drawings, but already not numerous, are distinguished by wavy cloudlets, as roughly designed.

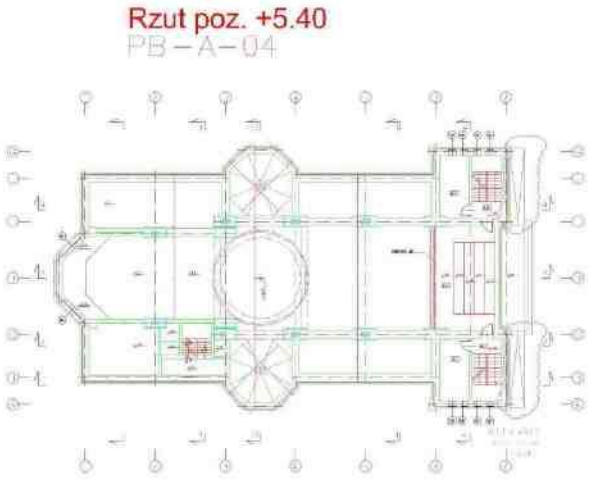

Fig. 8. Plan – horizontal cross-section - levels +2.70/ + 3.66m.

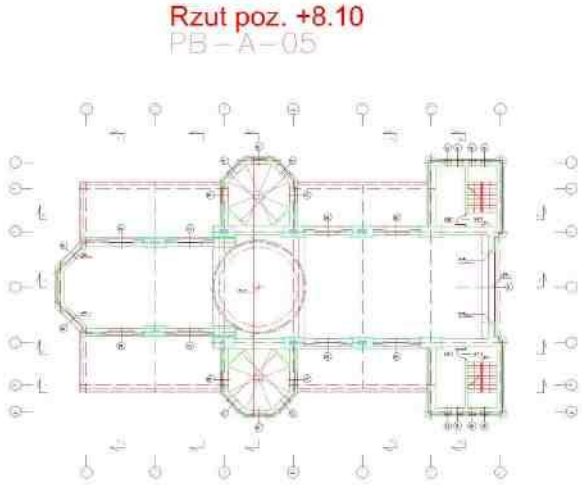

Fig. 9. Plan – horizontal cross-section - levels +2.70/ + 3.66m.

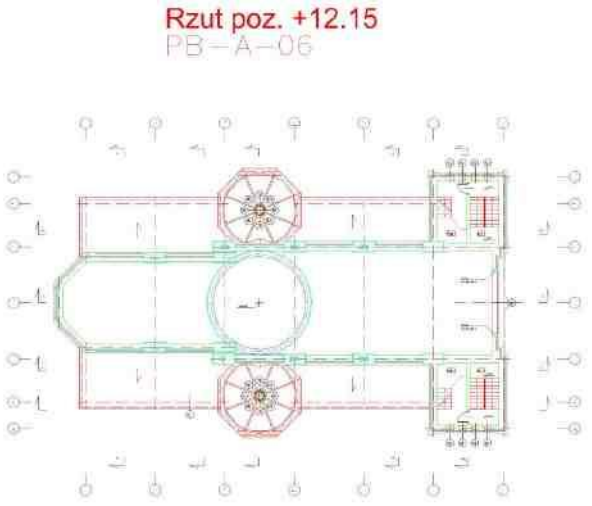

Fig. 10. Plan – horizontal cross-section - levels +2.70/ + 3.66m.

All the drawings, as well of architectural as of structural character, have unified system of the transversal (A to E), longitudinal (1 to 4) and horizontal cross-sections (recognized by levels given in [m]). On structural drawings are shown mainly elements of carrying and stiffening system.

Into Konrad's architectural drawings are mounted some pictures of double layer bar structures including the skylight, elaborated by J.B.Obrębski. More detailed drawings of these structures are given on further Figures.

Fig. 11. Plan – horizontal cross-section - levels +2.70/ + 3.66m.

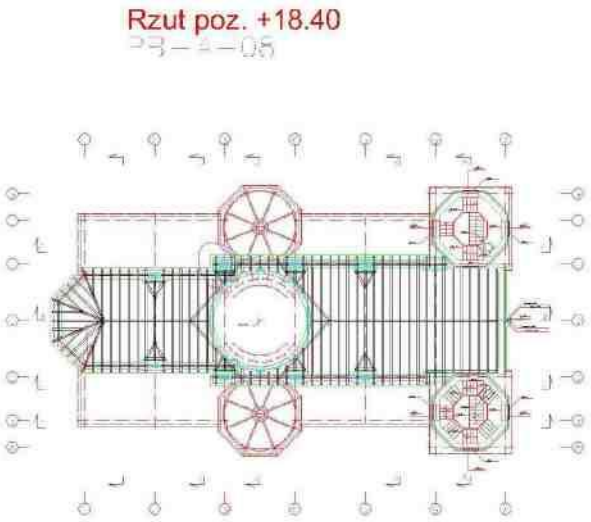

Fig. 12. Plan – horizontal cross-section - levels +2.70/ + 3.66m.

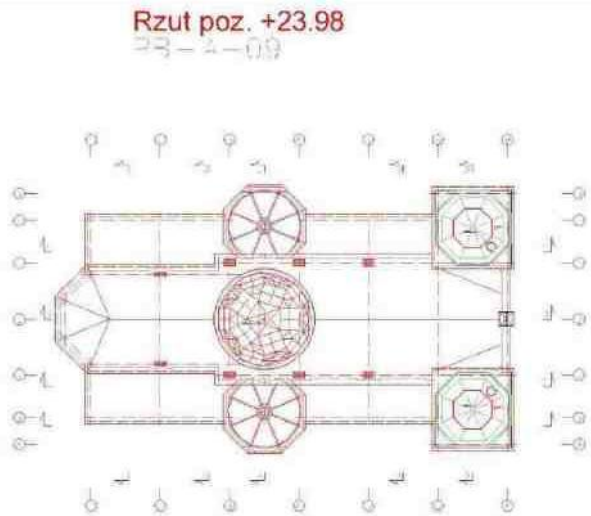

Fig. 13. Plan – horizontal cross-section - levels +2.70/ + 3.66m.

It should be turned here attention on such elements of the architectural drawings, which were corrected with regard to state from 9.02.2012. Especially, are completed, or corrected following details:

- windows in tambourine,
- windows in masonry ribbed domes,
- slight modification of the solution for the lantern at top of masonry ribbed domes,
- shape of main "elliptical" girders for main floor on ground level.

Proposed changes follow simply from:

- completion of the drawings,
- simply incompatibility between some drawings,
- better structural solutions,
- to adjust structure to architecture or architecture to structure.

In all cases of the drawings modification is kept high priority of architectural Konrad's conceptions. If possible, structure is adapted to His proposals.

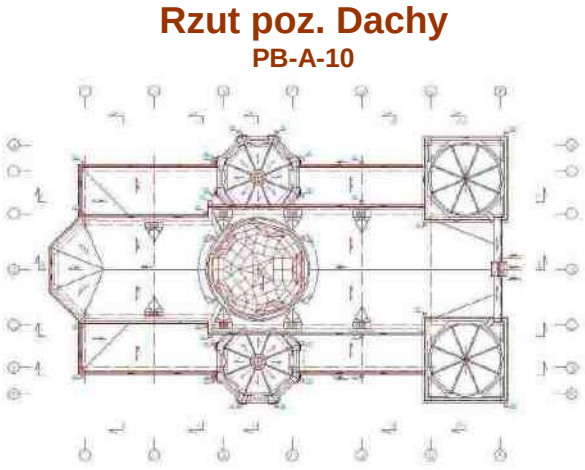

Fig. 14. Plan – view on roofs.

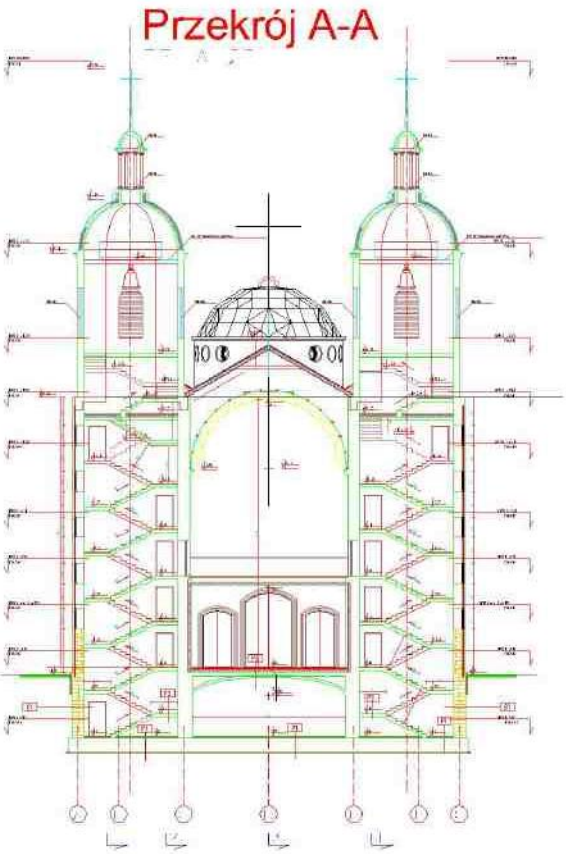

Fig. 15. Vertical transversal cross-section A-A

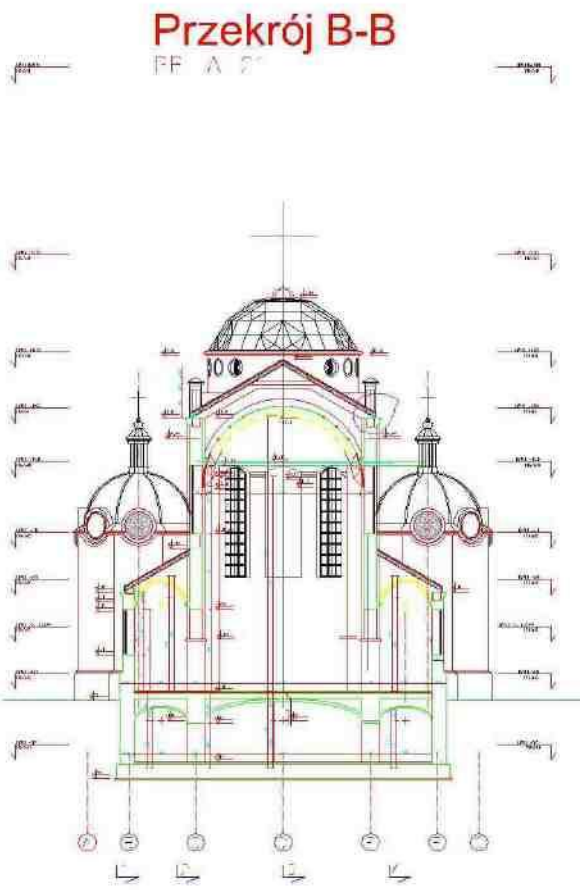

Fig. 16. Vertical transversal cross-section B-B

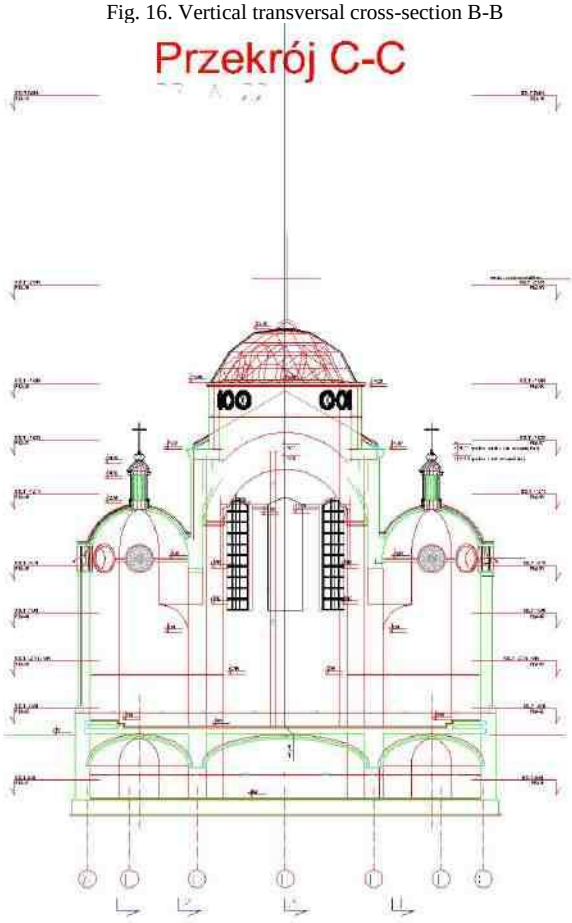

Fig. 17. Vertical transversal cross-section C-C

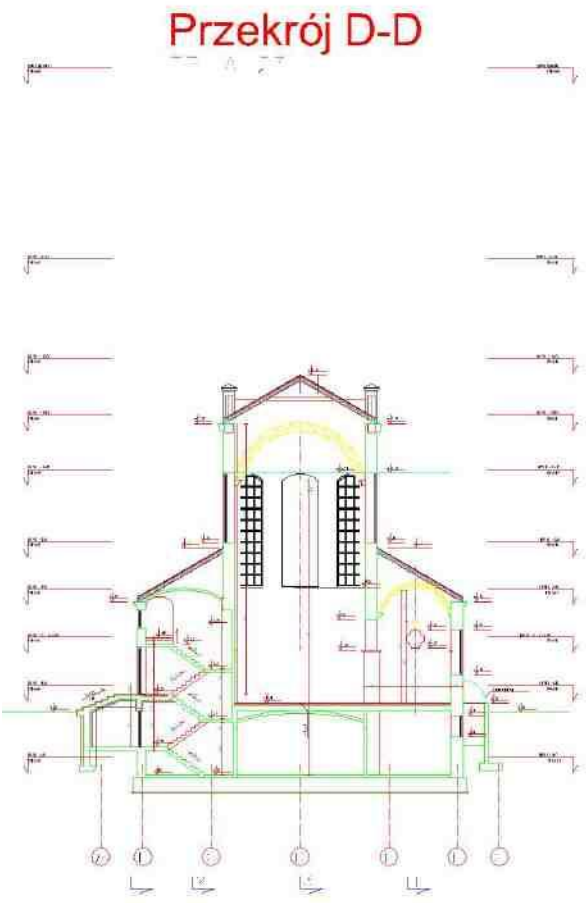

Fig. 18. Vertical transversal cross-section D-D

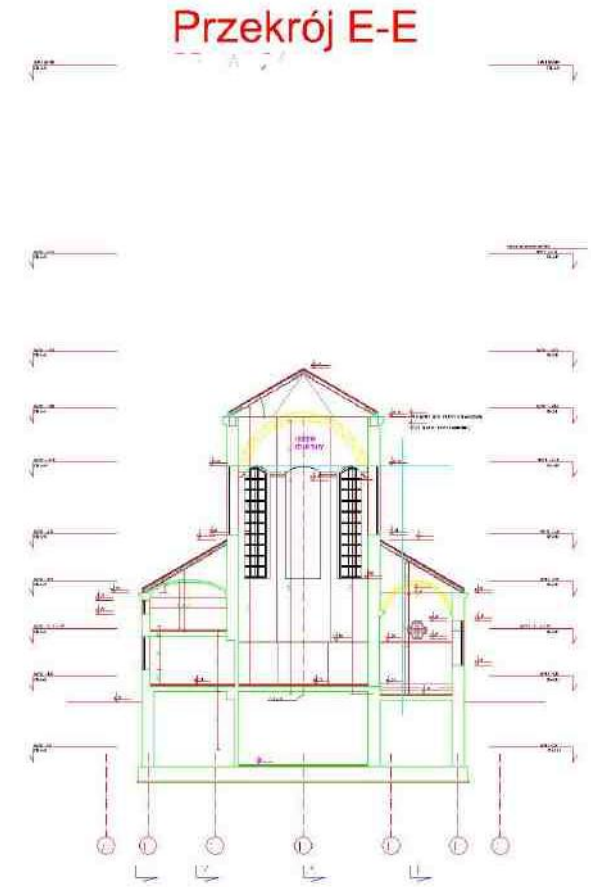

Fig. 19. Vertical transversal cross-section E-E

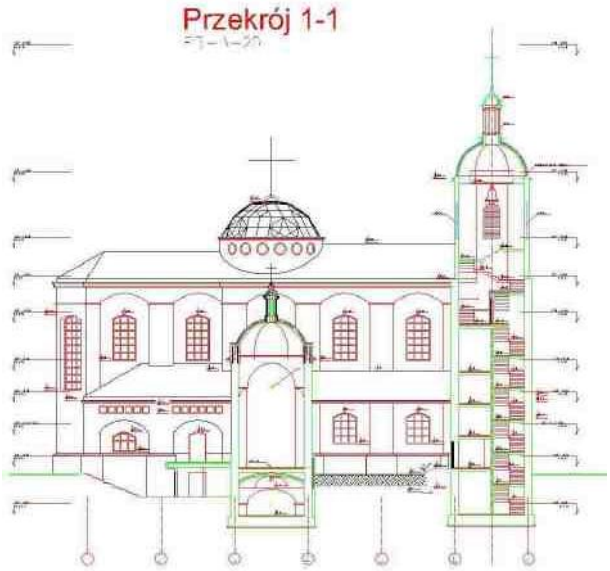

Fig. 20. Vertical longitudinal cross-section 1-1

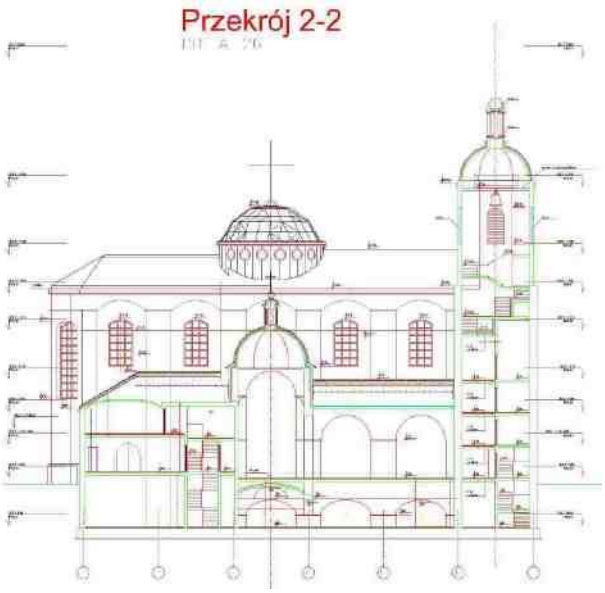

Fig. 21. Vertical longitudinal cross-section 2-2

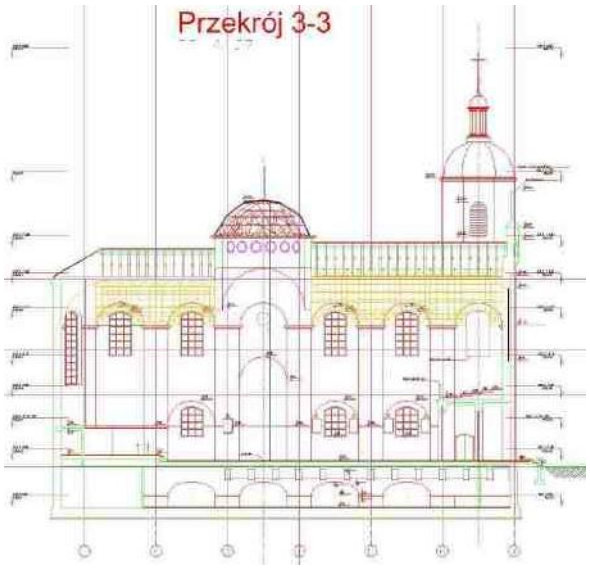

Fig. 22. Vertical longitudinal cross-section 3-3

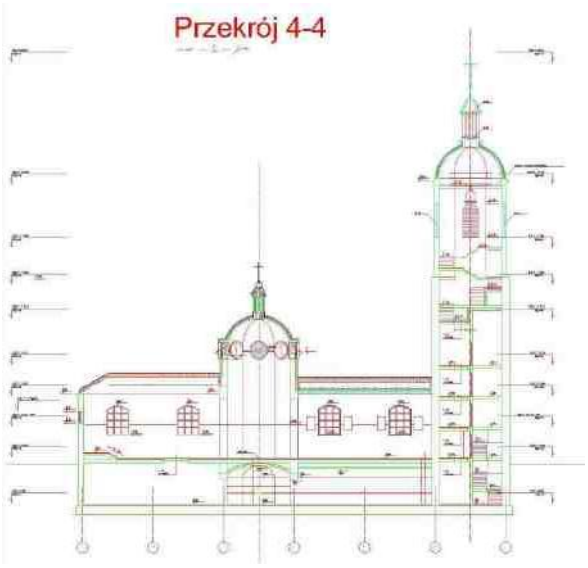

Fig. 23. Vertical longitudinal cross-section 4-4

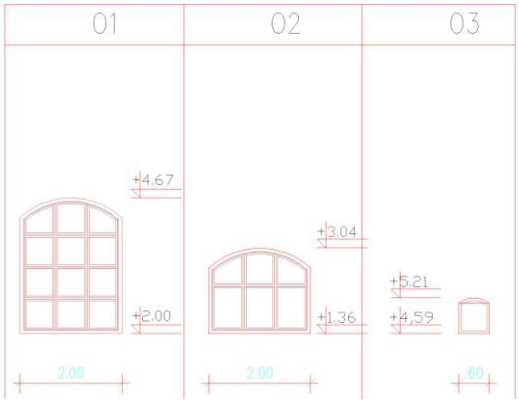

Fig. 24. Windows type 01 side naves and side chapel; 02 for sacristy and 03 for room over sacristy

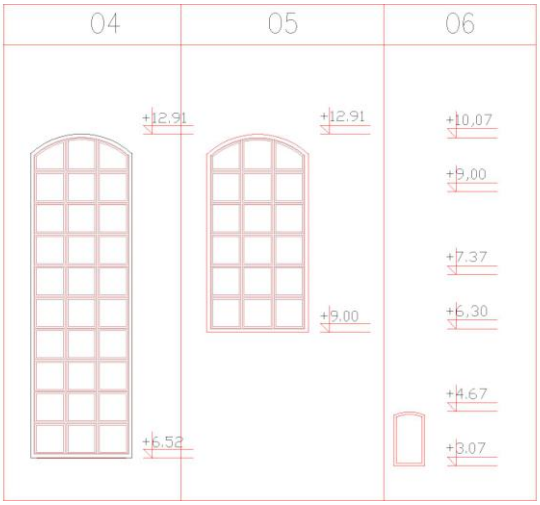

Fig. 25. Windows type 04 for apse, 05 for main nave and 06 for towers

Presented here architectural drawings related to church elevations and transversal cross-sections, are shown in almost identical scale. The longitudinal and plans - horizontal cross-sections, are presented similarly in common scale. The details are closed-up so far, as possible.

2

High attention Konrad was turned on sacral elements of internal church architecture. The structural solutions were evidently leaving for constructor. So, on His drawings we can find detailed solutions of the windows, pointing which one should be glassed by safe glass, antiburglas or as finished as stained glass, Figs 24-26.

Similarly, He leaves precise proposal of location and appearance of cross-stations and altar – Lord's Table, Figs 27-28.

Especially, His care was focused on extremely largeness of circular rosette in main façade and its appearance

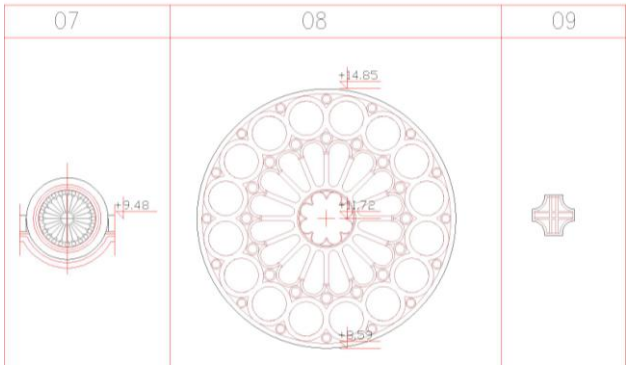

Fig. 26. Windows with stained glass: for octagonal chapels, large rosette in main nave over choir and in the front of side rectangular chapel.

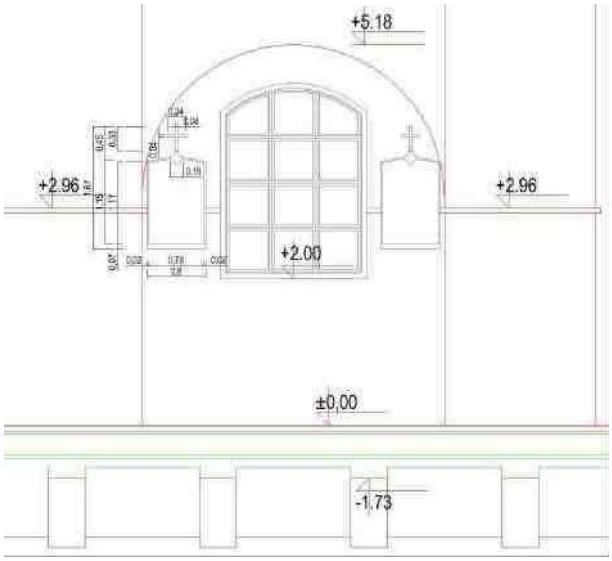

Fig. 27. Location and dimensions of cross-stations, PB-A-Dk, A4.

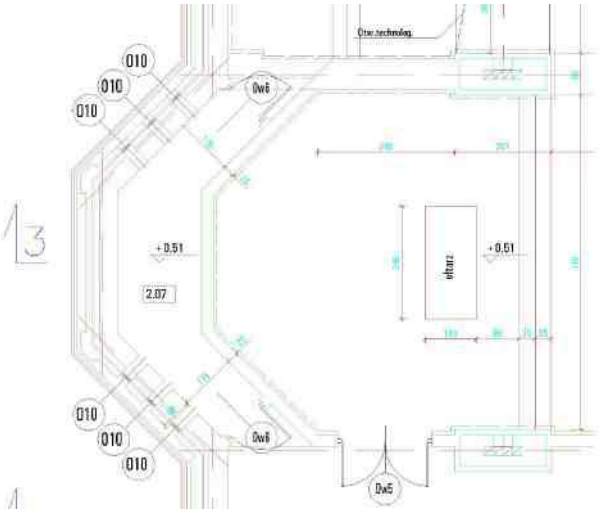

Fig. 28. Presbytery and altar location

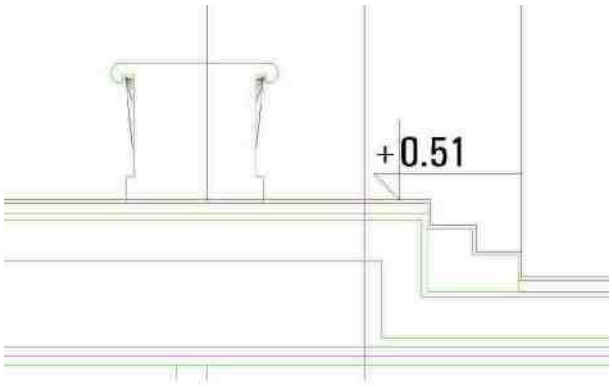

Fig. 29. Longitudinal cross-section throw the altar and steps to presbytery.

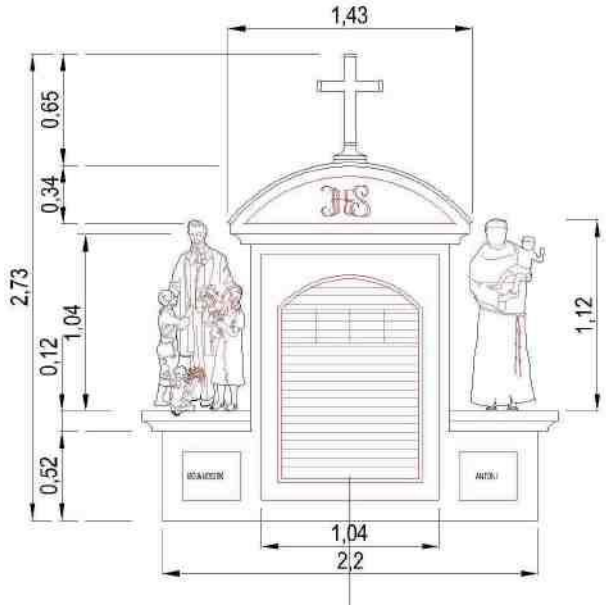

Fig. 30. Arrangement of top part of main column C2 – exhaust of ventilation chimney, with sculptures - figures of Saints Bojanowski and Antoni, A4.

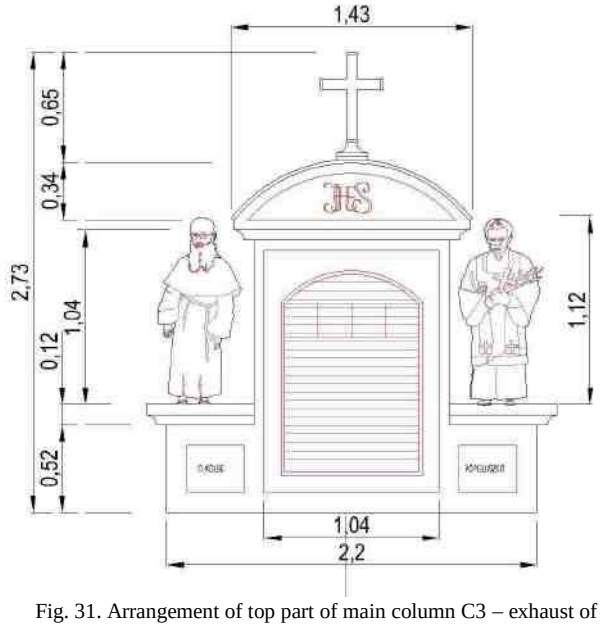

Fig. 31. Arrangement of top part of main column C3 – exhaust of ventilation chimney, with sculptures - figures of Saint O. Kolbe and blessed Jerzy Popieuszko, A4.

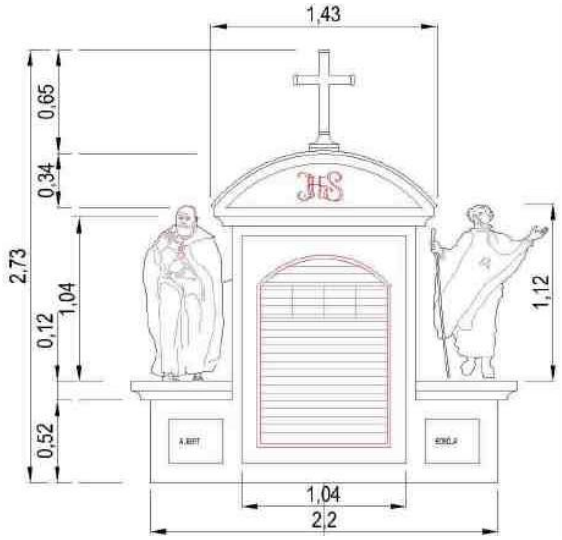

Fig. 32. Arrangement of top part of main column C4 – exhaust of ventilation chimney, with sculptures - figures of Saints Brother Albert and Andrzej Bobola, A4.

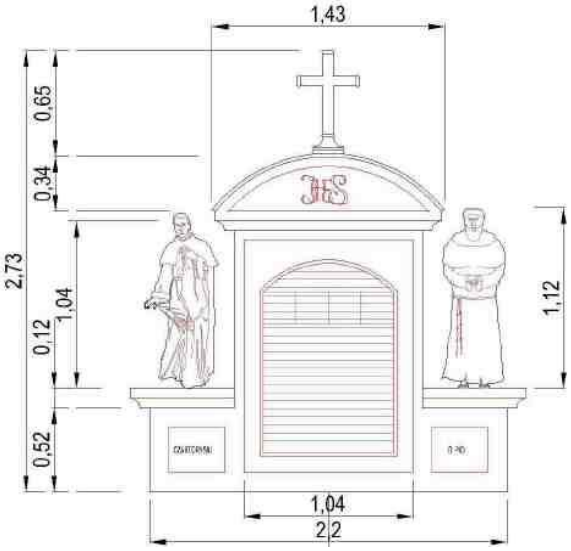

Fig. 33. Top part of main column C5 – exhaust of ventilation chimney, with sculptures - figures of Saints Michał Czartoryski and Saint Brother Pio, A4.

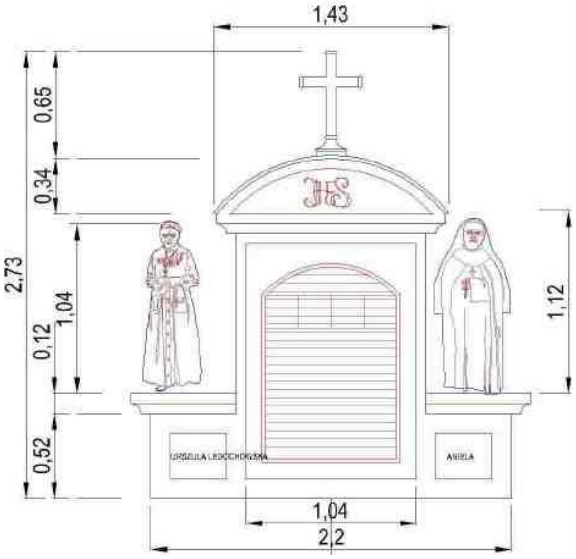

Fig. 34. Top part of main column E2 – exhaust of ventilation chimney, with sculptures - figures of Saints Urszula Ledochowska and Aniela, A4.

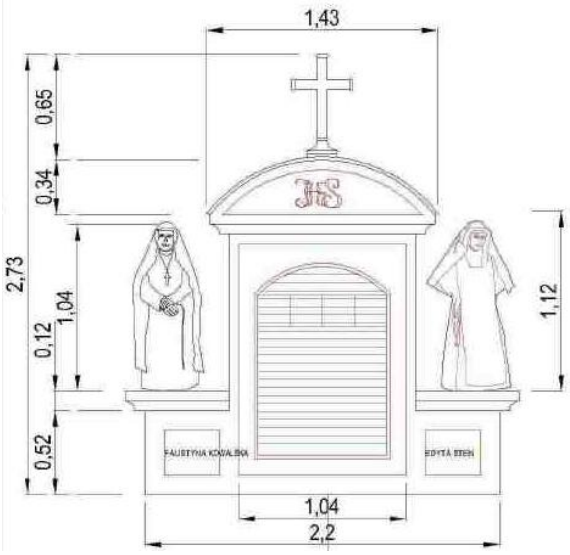

Fig. 35. Arrangement of top part of main column E3 – exhaust of ventilation chimney, with sculptures - figures of Saints Faustyna Kowalska and Edyta Stein, A4.

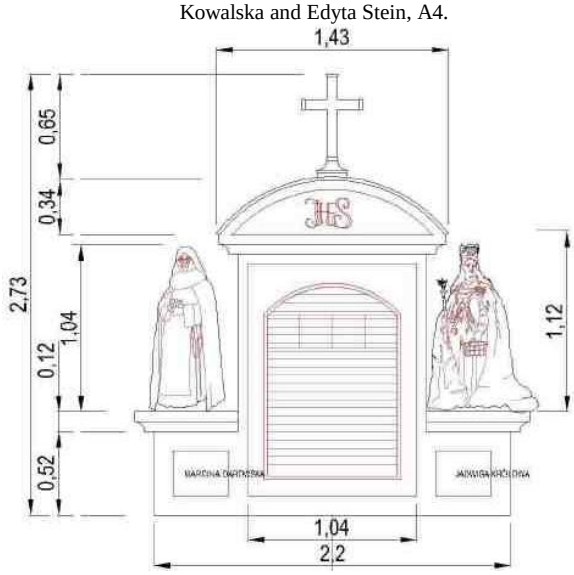

Fig. 36. Arrangement of top part of main column E4 – exhaust of ventilation chimney, with sculptures - figures of Saints Marcina Darowska and Jadwiga queen of Poland, A4.

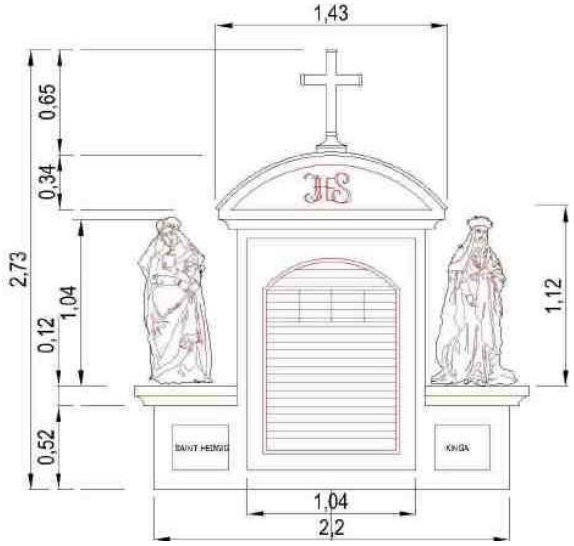

Fig. 37. Arrangement of top part of main column E5 – exhaust of ventilation chimney, with sculptures - figures of Saints Hedwig and Kinga, A4.

Fig. 38a. Proposal of arrangement of bricks in wall – named as “cross”

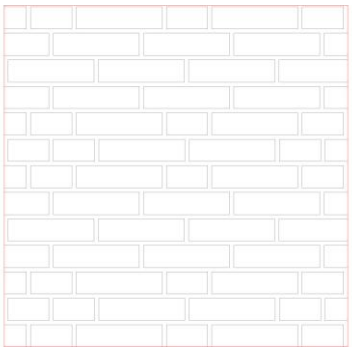

Fig. 38b. Closing-up bricks arrangement “cross”

Fig. 39a. Second bricks arrangement in wall – named as “cross 2”

Fig. 39b. Closing-up bricks arrangement “cross 2”

Fig. 40a. The proposal of arrangement the bricks – pointed as the best.

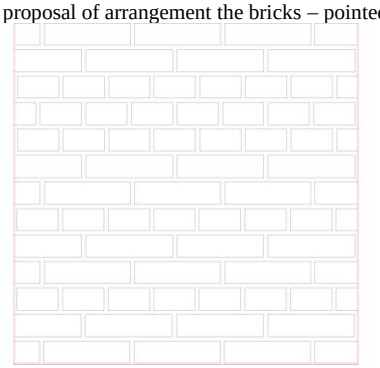

Fig. 40b. Closing-up bricks arrangement – pointed as the best.

3. SOME STRUCTURAL DRAWINGS

Below are given some drawings with structural solutions. All these drawings are located on proper formats. The drawings, now with regard to previous paper presented in LSCE 2009 book, are completed by new architectural elements and by system of reinforced-concrete frames hidden inside of masonry walls.

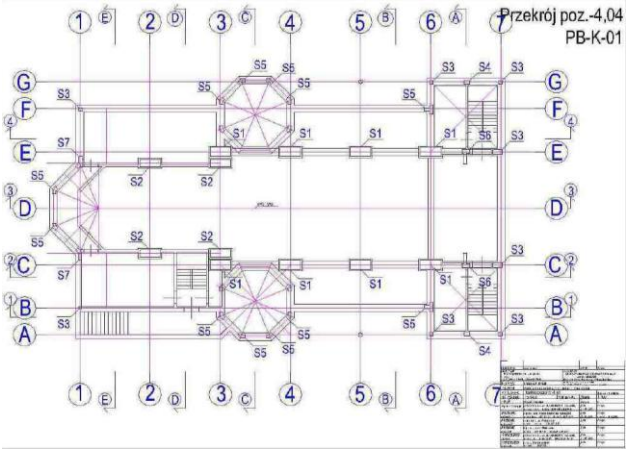

Fig. 41. Plan of underground level, A2. Visible location of columns.

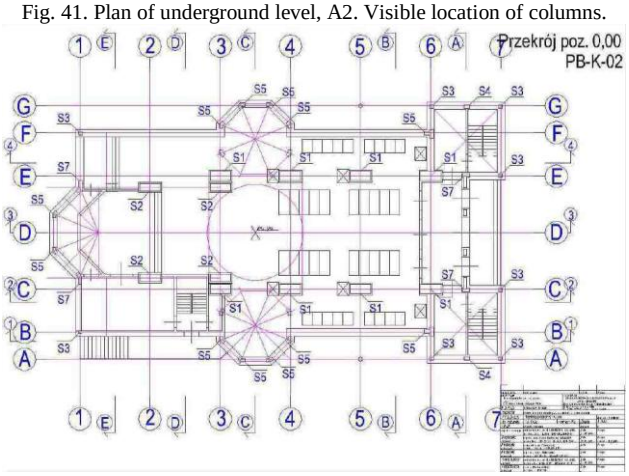

Fig. 42. Ground level, A2, with location of reinforced-concrete columns.

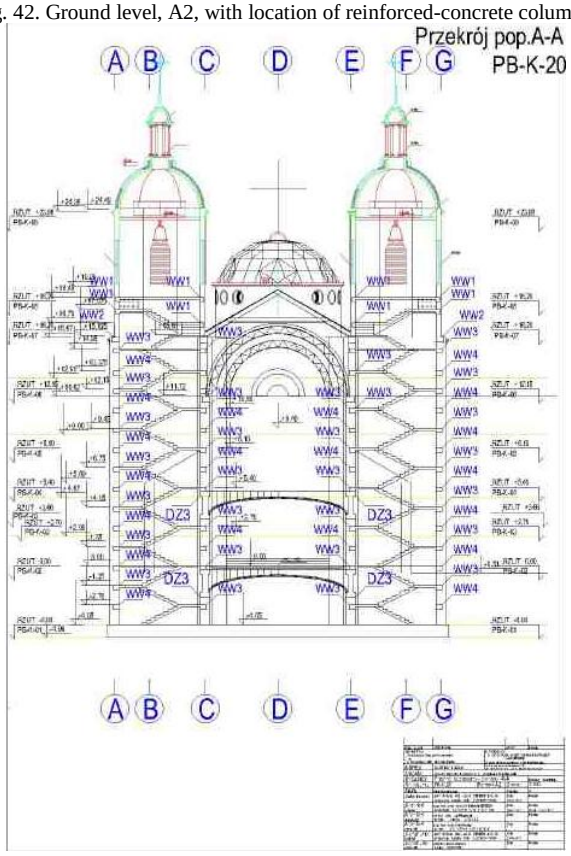

Fig. 43. Vertical cross-section A-A, A2. Visible location of RC rims.

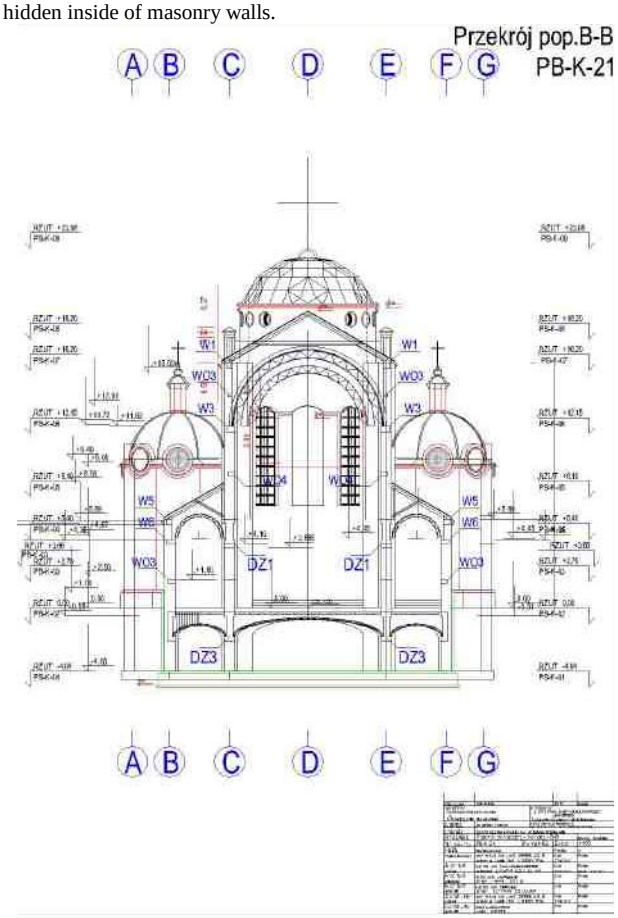

Fig. 44. Vertical cross-section B-B, A2. Visible location of RC wreaths.

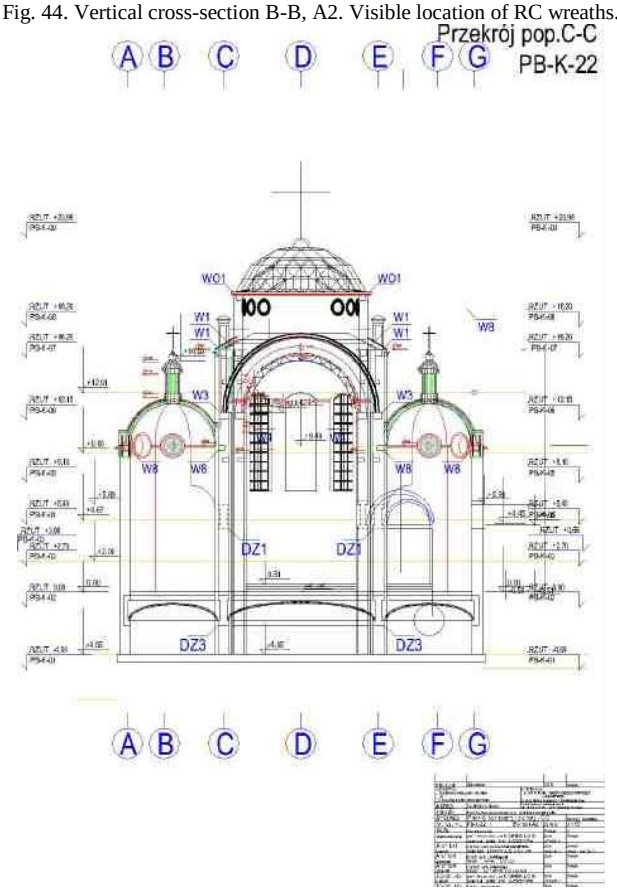

Fig. 45. Vertical cross-section C-C, A2. Visible location of RC rims.

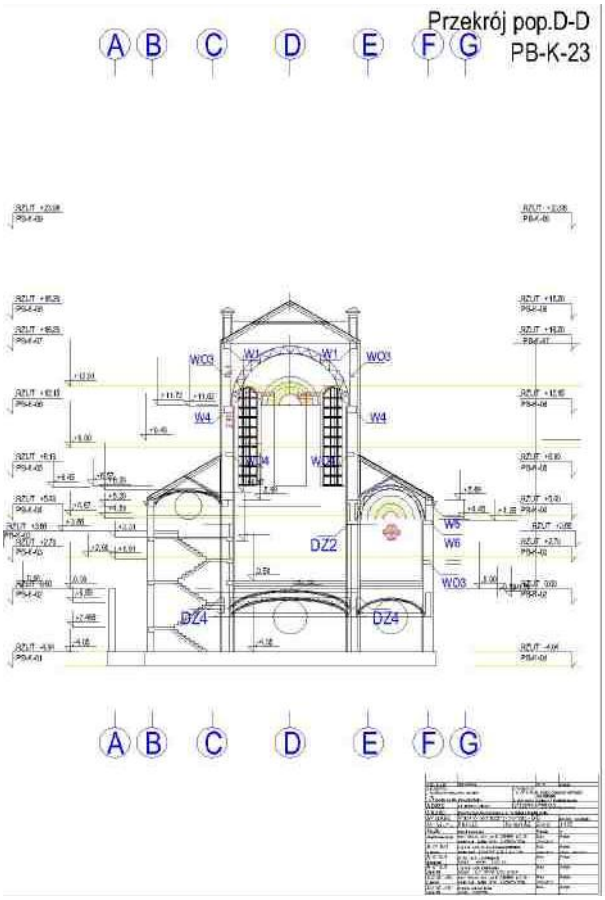

Fig. 46. Vertical cross-section D-D, A2. Visible location of RC wreaths.

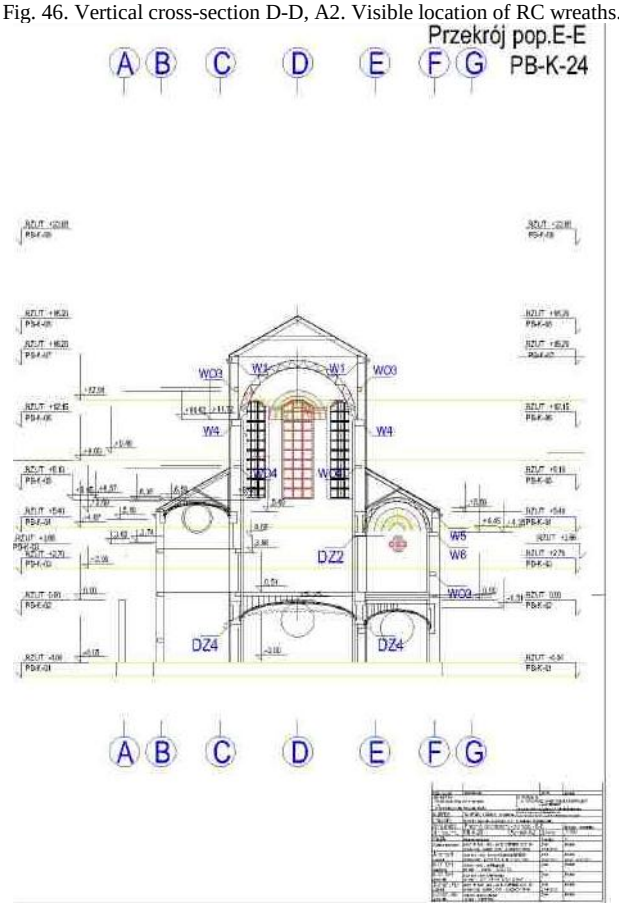

Fig. 47. Vertical cross-section E-E, A2. Visible location of RC wreaths.

For final solution of main girders of "elliptical" girders for ground level – shown in the Figs 46 and 47, please see Fig. 73.

All structural drawings are located on formats A2, A3 and A4 sheets of paper with identical tables, required by proper authorities. These drawings are under elaboration. Actually are solved the most difficult problems:

- Supporting system of skylight dome type UNIDOM, located over transept. Prototype of new space bar structure.
- Strong main floor for ground level supported on reinforced girders with elliptical shape at down and masonry elliptical vaults, similar to Klein flat coverings.
- Octagonal masonry domes with reinforced ribs and lantern at the top. Here, according to Konrad's suggestion, in the case of masonry domes on towers over lantern is foreseen elliptical cupola, Fig. 51.

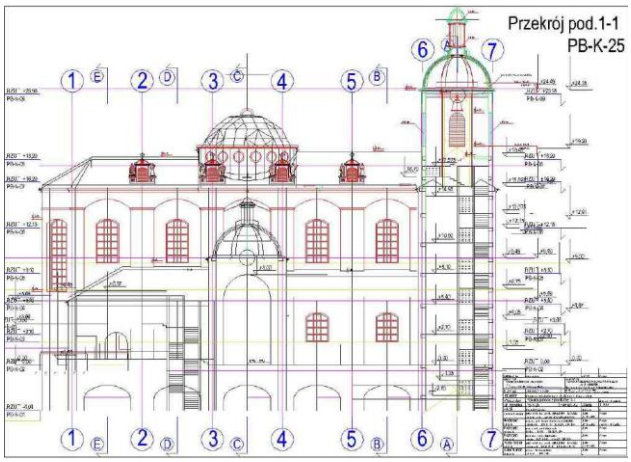

Fig. 48. Vertical cross-section 1-1, A2. Location of RC wreaths in tower.

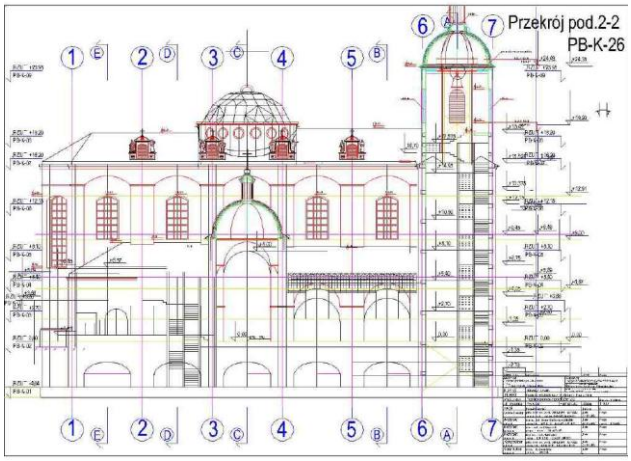

Fig. 49. Vertical cross-section 2-2, A2. Visible location of RC wreaths.

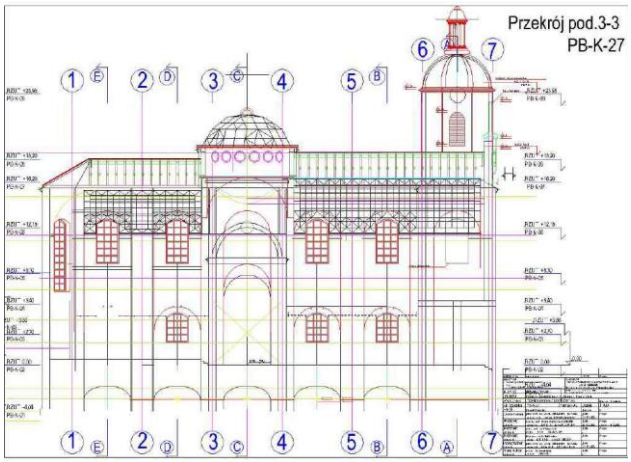

Fig. 50. Vertical cross-section 3-3, A2. Visible location of RC wreaths.

In the Fig. 51, still are shown two variants of left end of the roof over side rectangular chapel. The first with vertical gable part, and the second with slope 30^{o} for two inclined sweeps of roof. Probably will be applied the second version as in the Figs 2 and 23.

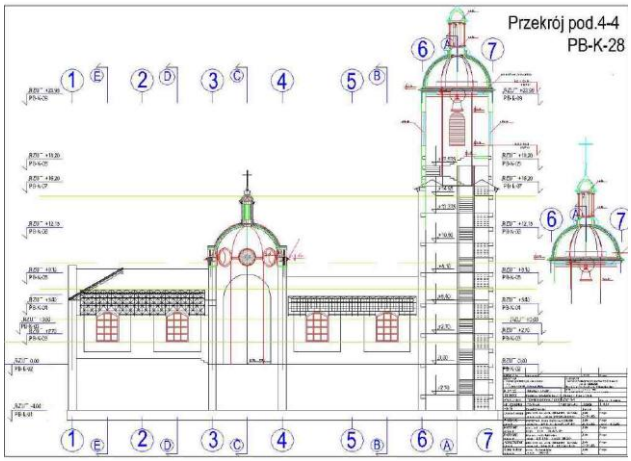

Fig. 51. Vertical cross-section 4-4, A2. Visible location of RC wreaths.

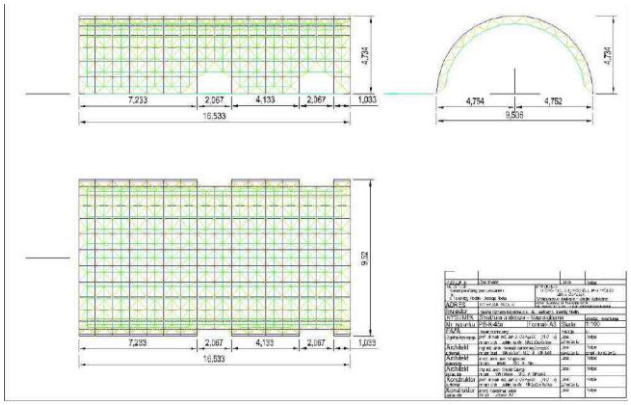

Fig. 52. Scheme of space bar structure over main nave, A3.

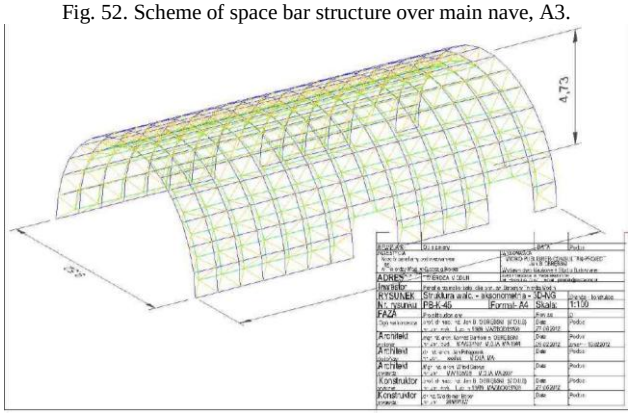

Fig. 53. Scheme of space bar structure over main nave. 3D view.

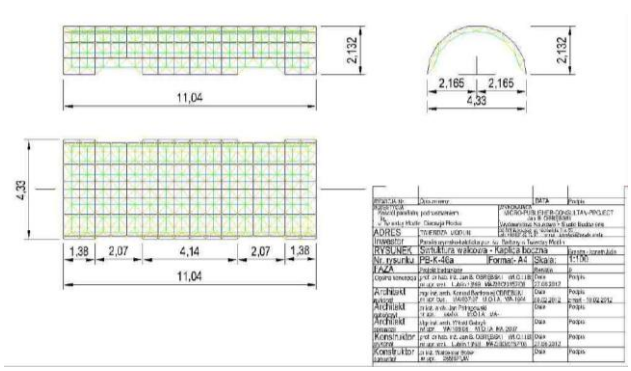

Fig. 54. Scheme of space bar structure over side chapel, A4.

The next series of drawing Figs 52 up to 63 presents the space bar structures foreseen for the church. All these pictures are given in the same scale 1:100, what gives opportunity to compare theirs size.

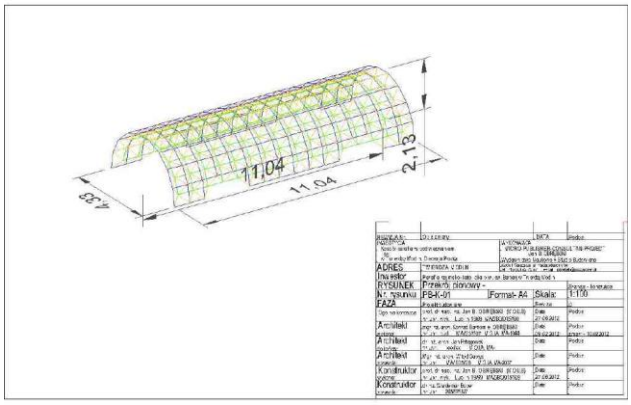

Fig. 55. Scheme of space bar structure over main nave, A4. 3D view.

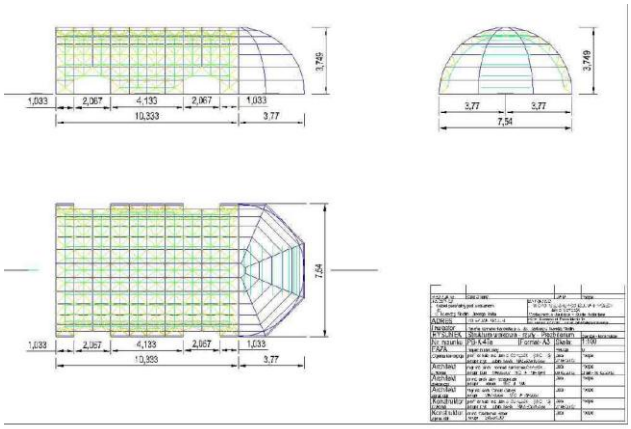

Fig. 56. Scheme of space bar structure over presbytery with apse, A3.

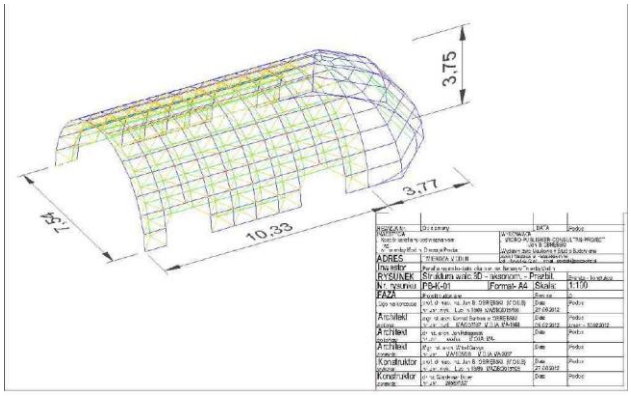

Fig. 57. Scheme of space bar structure over presbytery. 3D view, A4.

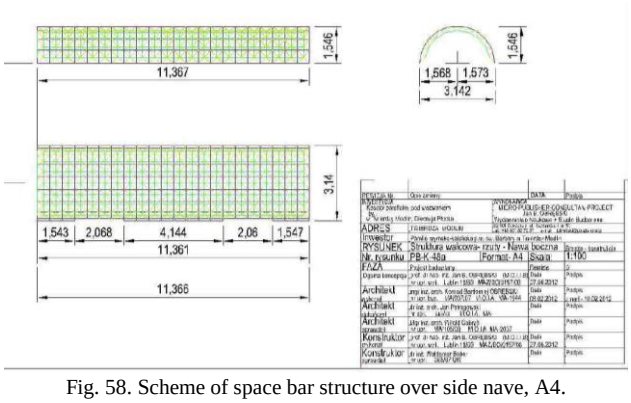

Fig. 58. Scheme of space bar structure over side nave, A4.

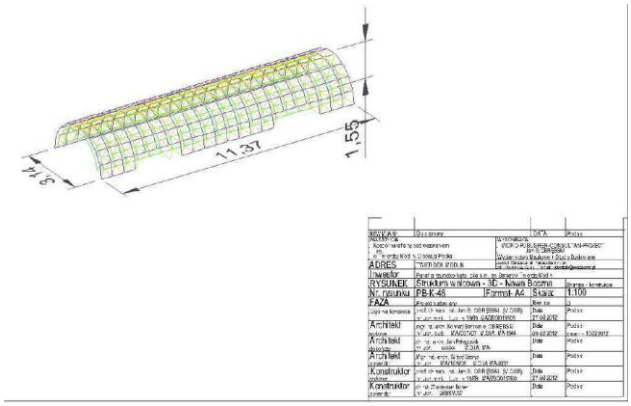

Fig. 59. Scheme of space bar structure over side nave. 3D view, A4.

Especially worthy of observation are Figs 60 to 63 presenting in the details dome of UNIDOM type. For the reason of rather complicated its structure, separately are presented: top layer, bottom layer and cross-bracings. Simultaneously each layer is presented in the other colour.

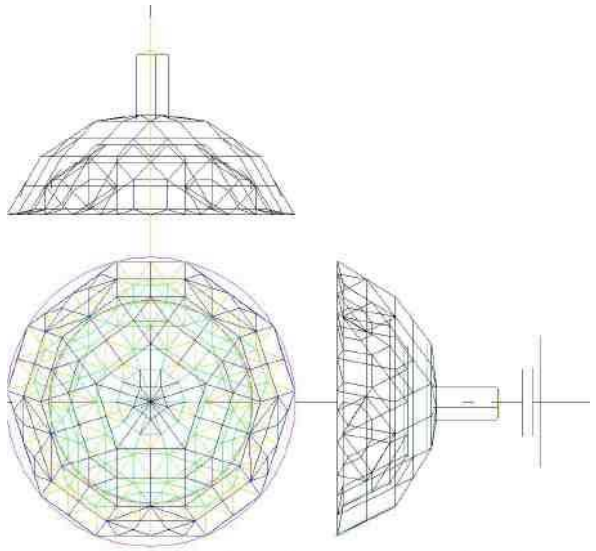

Fig. 60. Skylight of UNIDOM type, A4. Three views: front, top and side – left views.

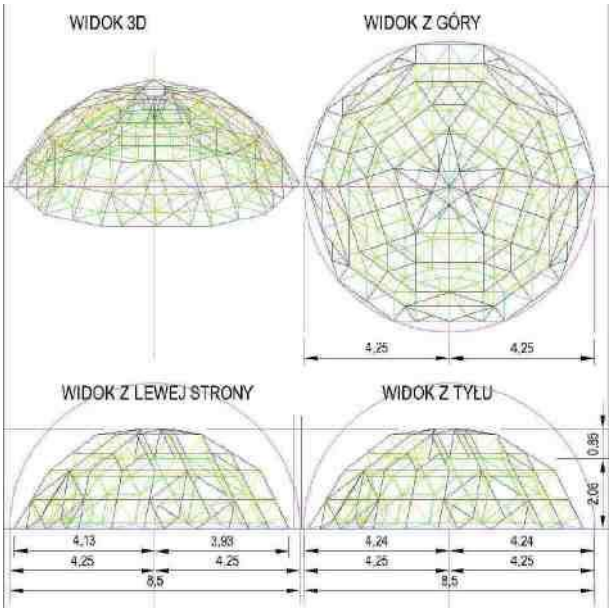

Fig. 61. Skylight of UNIDOM type. All bars, A4.

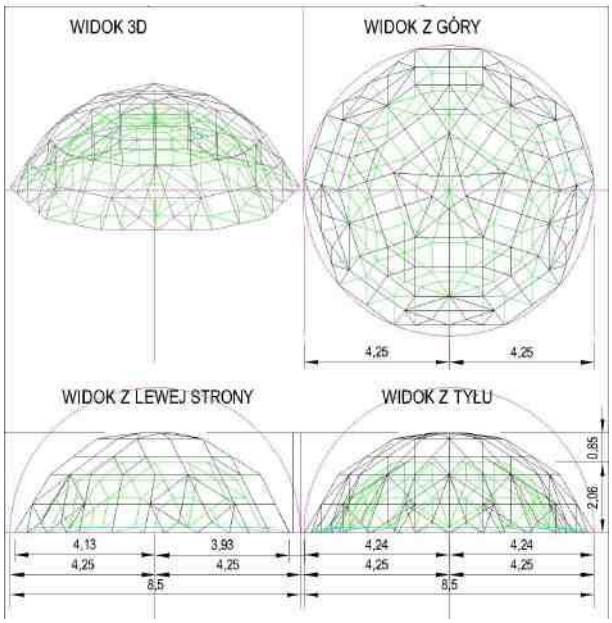

Fig. 62. Skylight of UNIDOM type, A4. Both layers. Views: 3D, top from left side and from back.

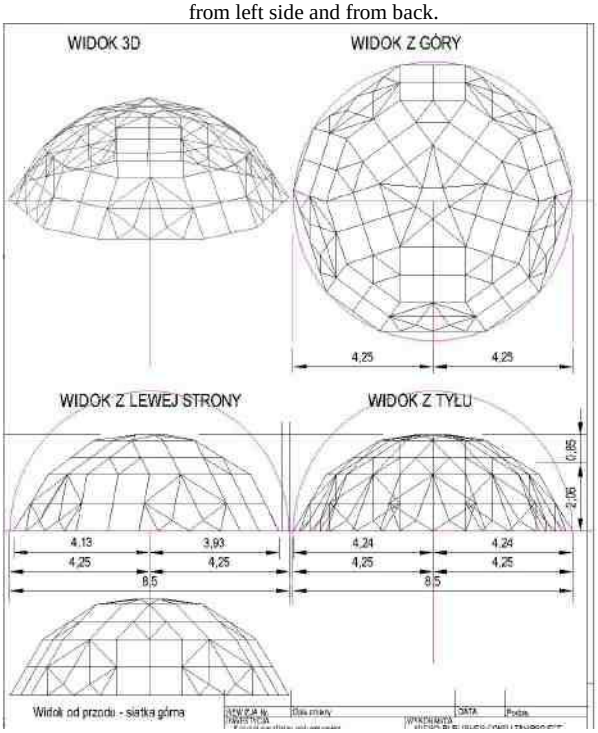

Fig. 63. Skylight of UNIDOM type. Both layers, A4. Views: 3D, top from left side and from back.

As it is visible on Figs 60-63, the skylight is not based on hemisphere. Its global shape is a deep sector of sphere. The external its contour (bars) is forming truncated decagon, but regular in sense five-manifold symmetry.

As it was discussed in previous papers, the dome consists from a few typical bars and practically can be used one node. As certain advantage, is mentioned relatively large decagon in centre of bottom layer.

In this presentation are not described details concerning of nodes, as well for UNIDOM type skylight as for space bar two-layer vaults shown as coverings of proper naves, Figs 52-59. These solutions will be included in the last moment to technical documentation of the church, when it will be clear, that erection of church will be decided and even started.

Konrad proposes to finish the skylight by hemisphere. On the other hand e.g. in the figure 68, there is shown kind of lantern on the top.

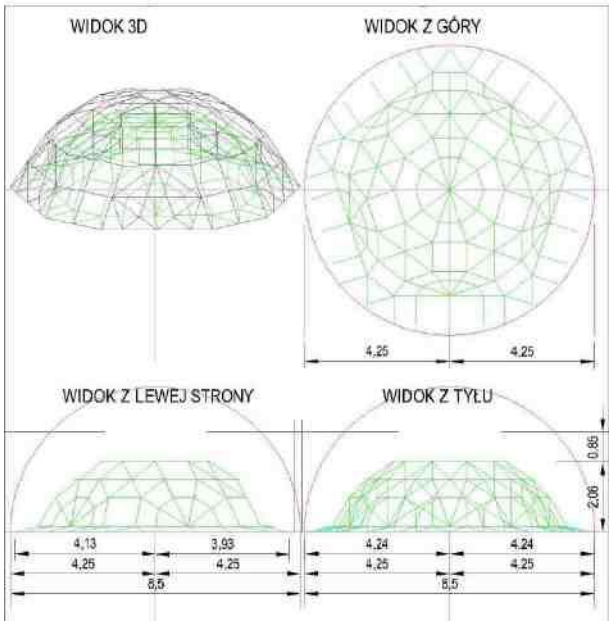

Fig. 64. Skylight of UNIDOM type, A4. Bottom layer. Views: 3D, top from left side and from back.

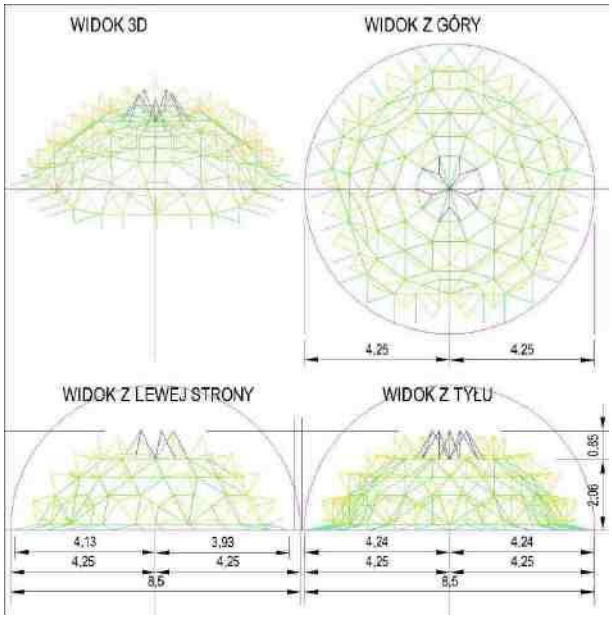

Fig. 65. Skylight of UNIDOM type. Bracings only. Views: 3D, top from left side and from back.

The next important solution concern of the reinforced-concrete shallow block, supporting the skylight and simultaneously forming a part of covering system, together with space bar vaults foreseen for main nave and for presbytery, Fig. 66.

Supporting system for the skylight, made from reinforced concrete, consists of half circular cylinder with horizontal longitudinal axis and crossing it vertical circular tube called as tambourine. In tambourine are foreseen 12 circular windows, for lighting and ventilation.

So, the central point of the church, together with transept arrangement, belong to the most complicated and difficult part of the building.

The good picture of the supporting system for skylight is given in the Fig. 66. Next, in the Fig. 67 is shown location of this reinforced-concrete combined shell. All together is supported by 4 main columns located in line of axes C-C and E-E.

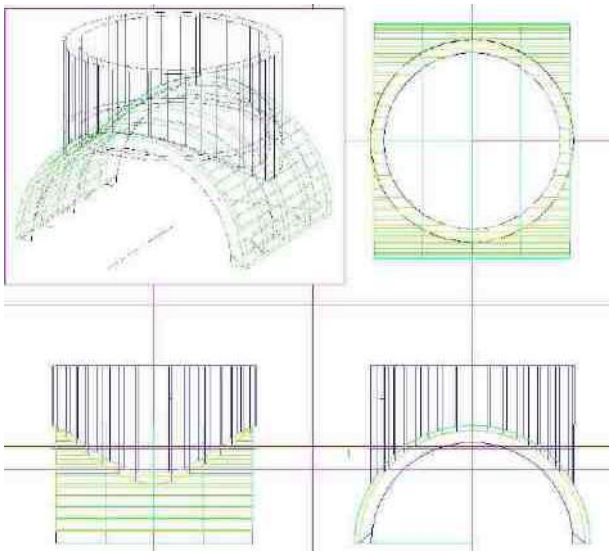

Fig. 66. Reinforced-concrete system supporting the skylight – tambourine and half-cylindrical shell, A3.

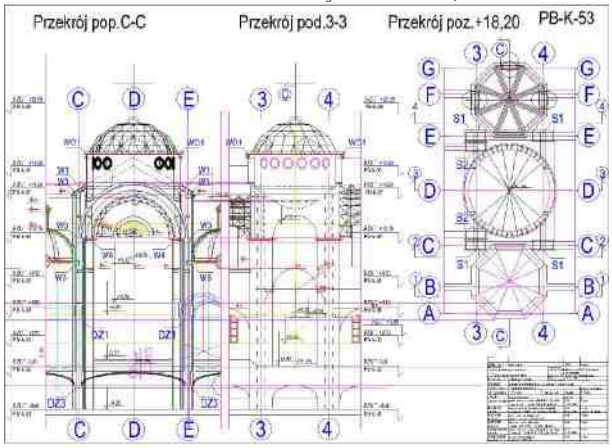

Fig. 67. Location of skylight and its supporting reinforced-concrete system over transept, A3.

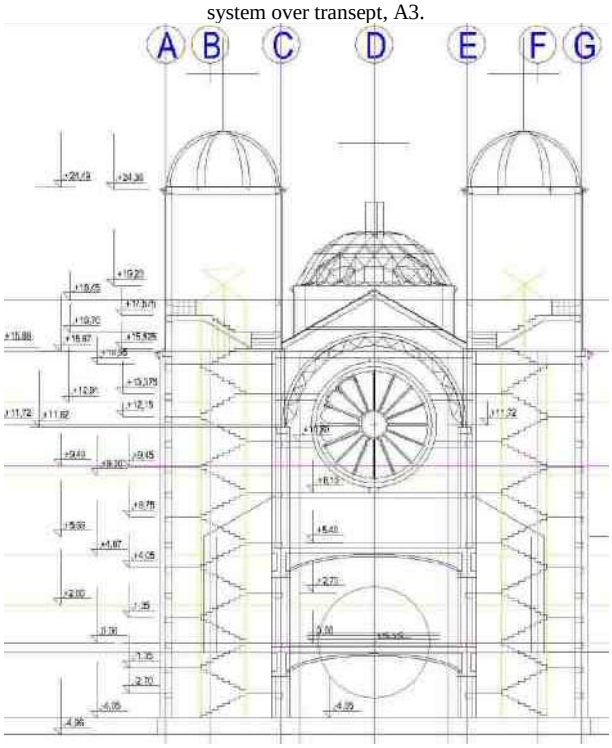

Fig. 68. Scheme of location for large circular rosette with regard to space bar cylindrical structures, PB-K-80; A2.

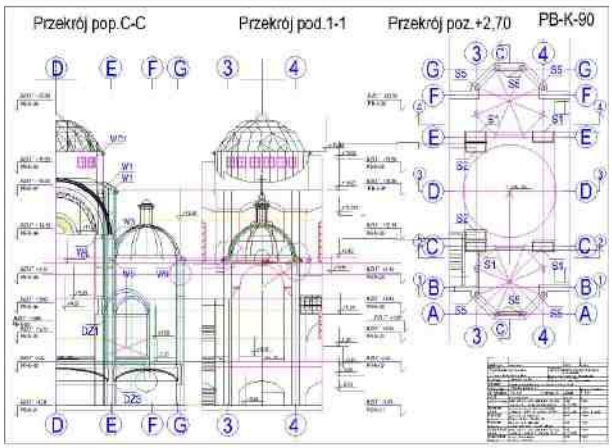

Fig. 69. Cross-sections of octagonal side chapel covered by masonry dome with reinforced-concrete ribs, PB-K-90a, A2.

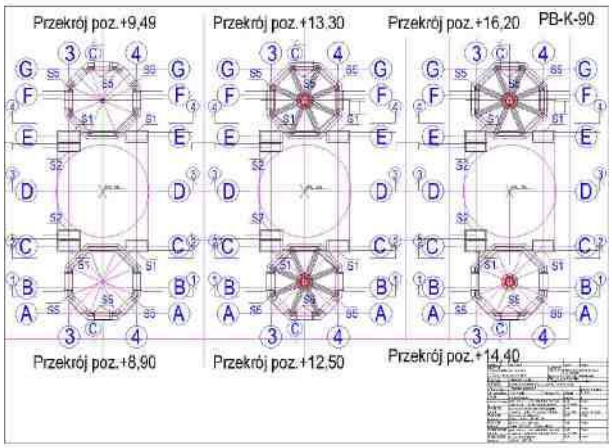

Fig. 70. Horizontal cross-sections of octagonal side chapel covered by masonry dome with reinforced-concrete ribs. Levels +8.9 to +16.2. PB-K-90b. A2.

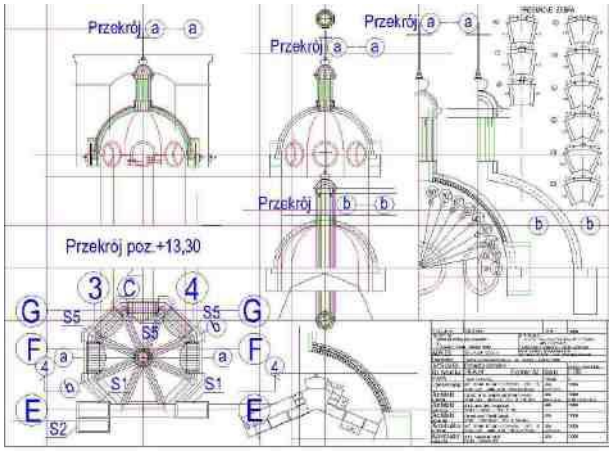

Fig. 71. Cross-sections of masonry dome with reinforced-concrete ribs covering the octagonal side chapel.

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As it is shown in the Figs. 70 to 72, the geometry of masonry dome is rather unconventional. Especially the ribs have relatively variable cross-section (see Fig. 71, right upper corner).

In reality proposed technology of carrying out such dome is very easy and was practically done in cemetery chapel in Wola Kiełpińska (see LSCE 2009 book).

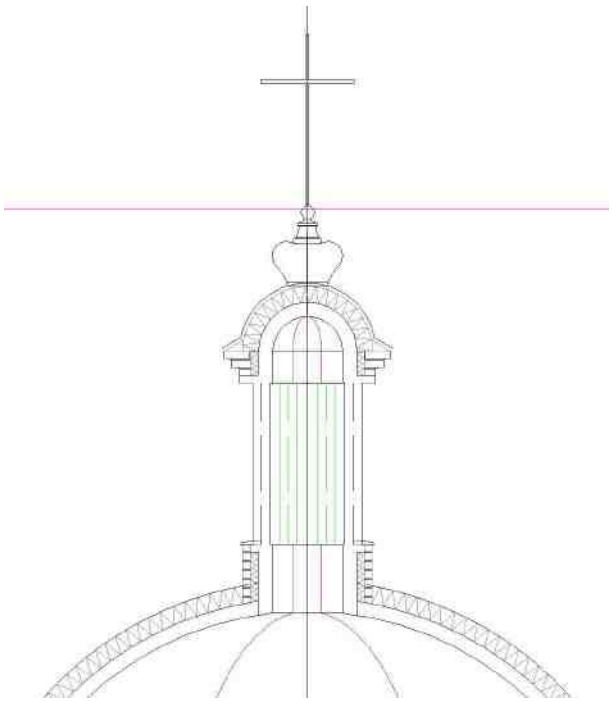

Fig. 72. Detail of lantern located on top of masonry dome with reinforced-concrete ribs covering the octagonal side chapel, A4. PB-K-91.

Fig. 73. Main girders for ground level floor, A3.

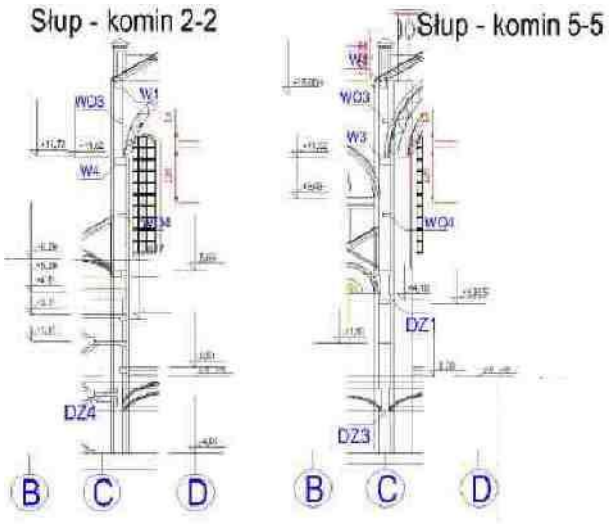

Fig. 74. Two typical masonry-reinforced-concrete columns-chimneys. At top over roof is visible decorative element with sculptures,PB-K-97a, A3.

The next interesting element of the church form system of ventilation chimneys, hidden in main columns. There, is decorative protection with

sculptures in both sides, for exhaust of ventilation flues led in chimney. The proposal of such decorative elements, very elegant and practical, belongs to Konrad.

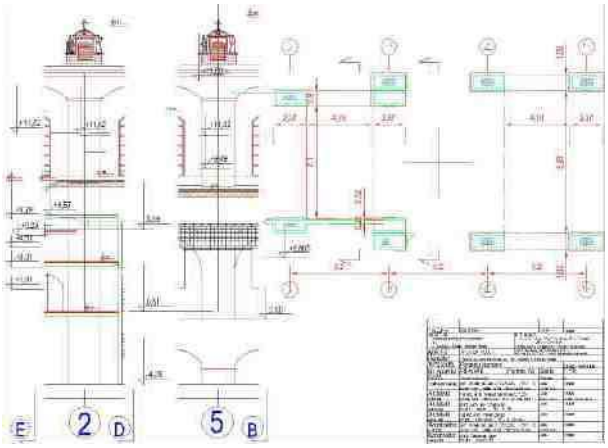

Fig. 75. Two typical masonry-reinforced-concrete columns-chimneys. At top over roof is visible decorative element with sculptures. Additionally are shown ventilation flues. PB-K-97b, A3.

4. FINAL REMARKS AND CONCLUSION

The designing process project of the church for the stronghold named Fortress Modlin, was started in December, 2008 on order of parish dr Cezary Siemiński. It was in accordance with decree of the bishop P. Libera from Płock.

On the first stage were long time negotiated principal assumptions and size and shape of the church. The designing process has started really in the beginning of 2011. From the moment were calculated and dimensioned all space bar structures, masonry domes and structure of main floor etc.

From the beginning, is not defined final location of the church in the whole Fortress. Also preliminary negotiations with conservator of monuments bring no satisfactory results. The difficulties concern rather not architecture, but location, only. It is very difficult to foresee if, and when will be obtained permission on construction.

At last, the death of Konrad brings a slow down the designing process. He leave set of 24 essential architectural drawings – elevations and sections and some auxiliary details, locations and sketches. All in AutoCAD – based on conceptual drawings prepared by Jan B. Obrębski. Konrad has introducing to His documentation many colours helping to distinguish materials and function particular parts of structure.

In His drawings we still can find many new details and architectural conceptions, which were put in one place and not distributed on whole project. This task He leaves to do in designing future.

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