INDEPENDENT STRUCTURE IN CREATIVE RE-USE OF SACRED ARCHITECTURE

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Abstract

The article discusses the independent structure as a tool of creative re-use of sacral buildings. On the basis of examples from the UK and Germany, their major advantages and disadvantages have been indicated, as well as basic trends related to their implementation. During the studies there were used: critical analysis of documents and source materials and analysis of architectural drawings and photographs. Research as well as this article are completed with a conclusion that the independent structure is an efficient, effective and compliant with actual conservational theory method of creative re-use of churches.

Streszczenie

W artykule omówiono niezależne struktury konstrukcyjne jak narzędzia adaptacji funkcjonalnej obiektów sakralnych. Wskazano ich atuty oraz ograniczenia, wskazano podstawowe kierunki w ich stosowaniu na podstawie przykładów z Wielkiej Brytanii i Niemiec. W badaniach posłużono się analizą krytyczną dokumentów i materiałów źródłowych oraz analizą rysunków architektonicznych i materiałów fotograficznych. Badania, jak i niniejszy artykuł jest zakończony wnioskiem, że niezależna struktura konstrukcyjna jest skutecznym, efektywnym i zgodnym z współczesną myślą konserwatorską narzędziem adaptacji obiektów sakralnych.

Keywords: **Church adaptation; Creative re-use; Independent structure; Sacral architecture; Redundant churches.**

1. INTRODUCTION

Due to the changing needs of the society, many churches in Europe are becoming a subject to adaptation to new functional requirements. The necessity for sectioning off smaller areas of different functions from the church nave space poses the key challenge in many church buildings. The research, the results of which have been described in this article, aimed at determining whether it is effective and feasible to use an independent structure for this purpose. Such a structure constitutes a separate, statically independent system in relation to the existing building substance, and at the same time makes it possible to modify the spatial and functional aspects of the building subject to adaptation. The research took into consideration first of all the aspects related to the conservation doctrine, influence exerted on the historical value of an object, impact on the consistency of its space, guaranteed flexibility and freedom in introducing a new function, layout and arrangement of the interior as well as costs of the investment. The objective was to estimate usefulness and compatibility of the application of independent structures in the functional adaptation of historical sacred buildings.

The incentive to conduct this research was provided first of all by deficiency in scientific literature which would undertake the issue of functional adaptation of churches understood as an architectural and building engineering activity. There are certain organizations working in the field of cultural heritage conservation which promote specific technical solutions, however, there exists no comprehensive compendium of possible spatial and functional adaptation solutions, such as alteration or conversion (of the facade or interior), extension, casing of the existing building as well as incorporation of an independent structure.

Hypothesis: An independent structure is an effective and successful method of the functional adaptive reuse of sacred buildings, that makes it possible to modify the functional system of the building in compliance with the binding conservation theory.

In the field of methodology, the research consisted of two stages: the selection of representative examples of church adaptations with the use of independent structures, and next, architectural studies of the above-mentioned examples. In the first phase, on the basis of literature studies, one analysed 160 sacred buildings from the UK and Germany adapted to new functions after 1960. Twelve of them constituted independent structures. Among these, eight representative examples were selected for further research. The procedure of choice consisted in defining among each of the group of objects, approximate to each other in type, form and material, one example, following the availability and reliability of sources of information. In the architectural studies of these examples one used first of all a graphic analysis encompassing the collected and processed architectural documentation and photographic material.

Research description: This paper contributes to the science in the scope of valorization of independent structures. The author sees the need for scientific reconnaissance of other spatial and functional solutions used in the adaptation of sacred buildings in terms of their efficiency and compliance with the binding conservation doctrine.

2. REASONS FOR CHURCH ADAPTATIONS

Incorporation of new structures is one of the implementation methods of adaptation of churches. Such an adaptation is always dictated by functional reasons, the most common being:

- the necessity of providing a sacred building with social and sanitary facilities;
- expanding the scope of use of a church – the church becomes also a social and cultural centre, e.g. a library, art gallery, conference room, café, etc.;
- the change of the function of a church.

All these reasons result in the necessity of sectioning off smaller functional zones from the vast space of the church. This can be achieved by means of constructions which bear down, transmit the load onto the existing building structure through independent structures or by adding a new functionally related object in the closest vicinity.

3. PROPERTIES OF INDEPENDENT STRUCTURES AS METHODS OF CHURCH ADAPTATIONS

Features of independent structures have been investigated on the basis of the analysis of buildings that had been built as sacral and afterwards a new or additional functional destination was introduced with use of an independent structure. Tabular juxtaposition and architectural drawings made in the study are presented in the following table and Figures 1 and 2.

3.1. Major assets of using independent structures

The primary asset of using independent structures in church adaptations is the assurance of maximum inviolability of the construction of an adapted object, which is particularly important when it is in a poor technical condition. At the same time, application of independent structures in architectural adaptation is compliant with a modern conservation theory which assumes a minimum interference and leaving a visual border between old and new substance [7].

Independent structures make it possible to divide the existing building vertically and horizontally with no detriment to its character. It also enables a better compatibility of the dimensions and proportions of new rooms with functional requirements in relation to the constructions based on the division of the existing interior. The introduced independent structure may constitute a permanent or temporary element which is possible to disassemble with no harm to historical substance.

3.2. Limitations on using independent structures

In certain static conditions independent structures may constitute the only possible solution. However, if there is a possibility to base a new structure on the elements of the existing structure, for instance new floors (ceilings) on old walls, as a general rule it proves less expensive. Independent structures reduce the original functional space of the interior and usually require their own foundation, which may threaten ground stability and negatively influence the underground constructional elements of the existing building substance, in particular, when the introduced construction exerts a heavy load on the

Table 1.
Selected examples of independent structures in church adaptations

	Present purpose of object, location	Adapted object	New structure	
			Implementation date, architect, adaptation cost	Constructional system, materials used in construction
A.	Municipal church Gross St. Martin Kirche, Cologne	St. Martin's Church	1995, Architects *Kister Scheithauer und Partner*	temporary steel structure – pillar and spandrel beam structure, filled with acrylic glass (walls and ceilings) and wood-like panels (floors)
B.	Municipal church Stadtpfarrkirche Sankt Marien, Müncheberg	Cistercian church, 13th c., destroyed in 1945, rebuilt in 1992	1998-1999, Architect *Klaus Block*, 2 m euro	steel frame construction with concrete filling (floors and partition walls on the ground floor), glass facade with enclosure made from ash slats
C.	Children's Museum *MACHmit!*, Berlin	St. Elijah's Church, 1907-1910	2000-2003, Architect *Klaus Block*, 1.6 m euro	steel skeleton on reinforced concrete columns, with pine wood lining (the interior) and fibre cement cladding panels (the facade)
D.	School Lecture Theatre *Martinszentrum*, Bernburg	St. Martin's Church, 1887-1891	2005-2007, Architects *Weis & Volkmann*	steel frame (steel skeleton) partly with glass infills, light partitions and solid walls
E.	Multifunctional social activation centre *All Souls Crompton Community Centre*, Bolton	All Souls Church, 1880-1881, Architects *Edward Graham Paley* and *Henry Austin*	Ongoing implementa-tion of adaptation Architects *OMI Architects*	framework floors (ceilings) on steel columns, the walls finished with prefabricated panels or plaster work on prime work
F.	The seat of *London Symphony Orchestra St. Luke's*, London	St. Luke's Church, 1729-1732, in ruin since 1959, Architects *John James* and *Nicholas Hawksmoor*	1995-2003, Architects *Levitt Bernstein Architects*, 12 m euro	reinforced concrete roof supported by branched steel columns of tubular cross section, with steel framework attached to them, which is a bearing element of the mezzanine
G.	Municipal church *St. Paul's Old Ford*, *Bow Project*, London	St. Paul's Church, 1878, closed down due to safety rea-sons in 1991	2001-2004, Architect *Matthew Lloyd Architects LLP* 4.3 m euro	steel frame (steel skeleton) supported by double steel columns of tubular cross section, stiffened by means of floors (ceilings) made of concrete slabs on the trape-zoidal galvanized metal sheet, outer walls insulated with mineral wool, finished with tulipwood plywood on the outside and MDF panels inside
H.	*The Garden Museum*, London	St. Mary's at Lambeth, ca. 1850, deconse-crated in 1972	adaptation in 2008, implementation period: 3 months, Architects *Dow Jones Architects,* 0.1 m euro	prefabricated structure made from glued laminated timber *glulam* and *crosslam*, in *Eurban* system, self-supporting structure, grounded directly on the church flooring

ground. Moreover, in comparison to a traditional division of the interior the incorporation of independent structures results in a bigger limitation on the usable surface.

Inviolability of the existing church is guaranteed by addition of a structurally independent but functionally related object in its vicinity. It is connected, however, with the necessity of occupying the space in the church vicinity, which is not always possible. It does not solve the issue of too big cubature of the church either.

4. MATERIALS USED FOR INDEPENDENT STRUCTURES

4.1. Steel frame as independent structure in adapted church

The analysis of examples of independent structures used in the adaptation of churches in the UK and Germany (see Figures 1 and 2 as well as Table 1) reveals that the most common constructional system is steel frame (steel skeleton). It is used both as an openwork partition (A, B, D – capital letters refer to the examples of implementations presented in Figures 1 and 2 as well as in Table 1) and steel frame

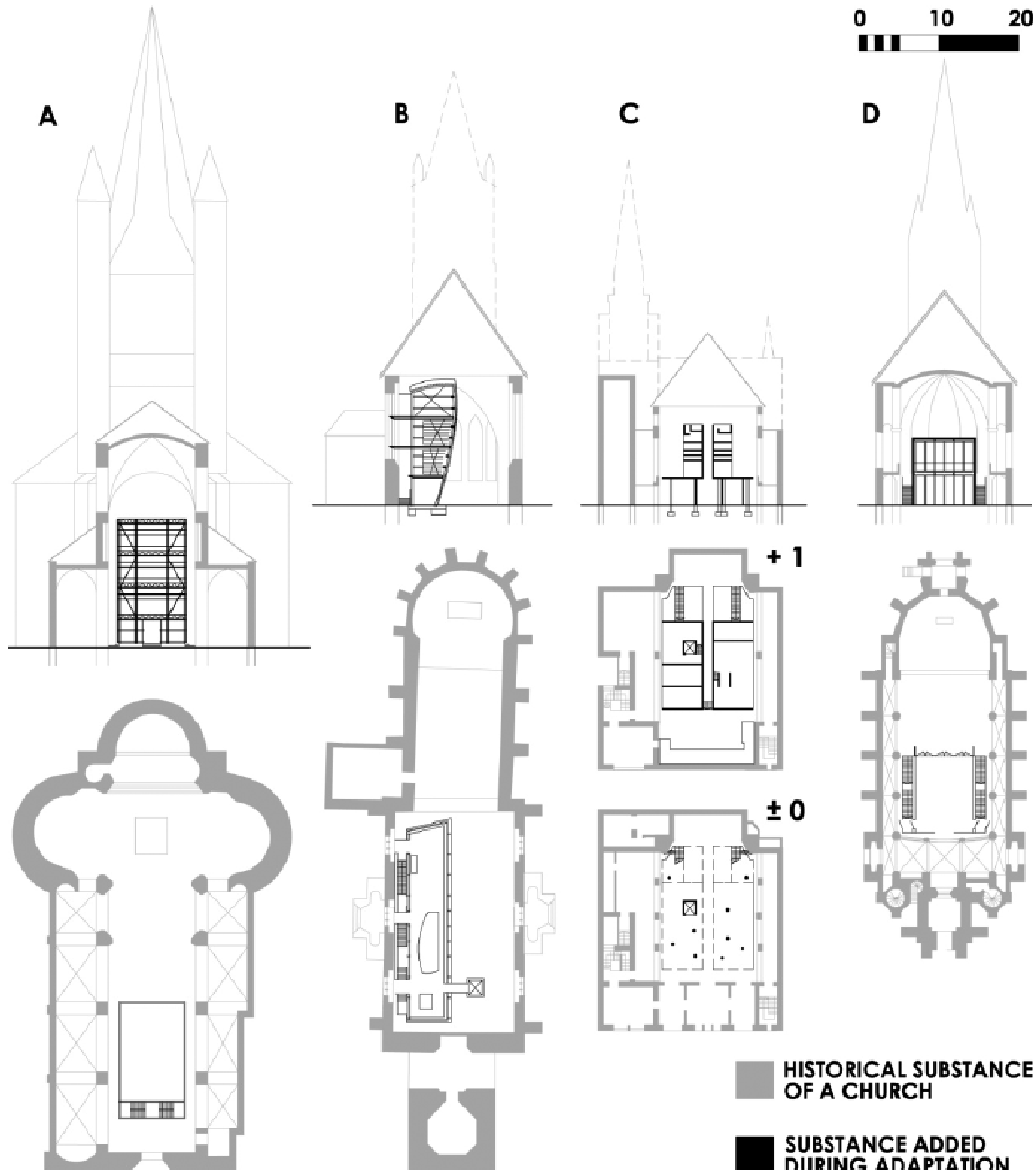

Figure 1.
Selected examples of independent structures in church adaptations in Germany (designations explained in Table 1) developed by the author on the basis of source data [1, 4, 5]

finished with some filling (C – fibre cement cladding panels, wood lining, E – prefabricated panels, plaster work on prime work, G – wooden cladding, painted MDF panels). Such a system provides a wide spectrum of possibilities within the range of methods of finishing the walls, floors and ceilings. It also gives liberty to create a form and to erect temporary structures (e.g. A).

4.2. Prefabricated wood-like units in adapted church

In the context of church adaptations, an innovative construction was applied in *The Garden Museum* in London (H). With the use of Eurban system a complex structure was created from prefabricated solid panels made of glued wood. The entire structure, from the walls to stairs, was made from this material. The structure is self-supporting, grounded directly on

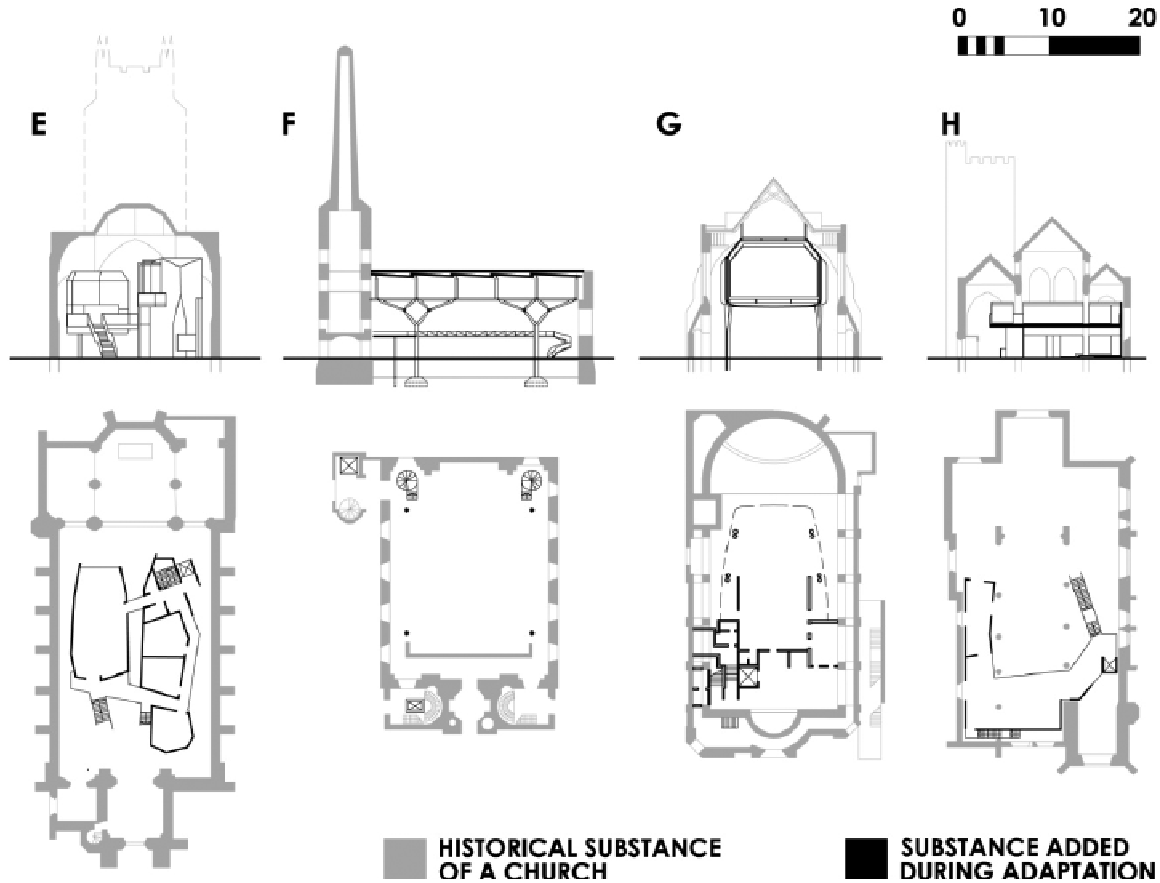

Figure 2.
Selected examples of independent structures in church adaptations in the UK (designations explained in Table 1) developed by the author on the basis of source data [1, 2, 4]

the floor and is not connected in any point with a historical substance of the object. Thanks to this fact, the implementation is fully reversible. It is also environmentally friendly and less expensive than other solutions (out of 300 thousand GBP allocated for this investment the sum of 93.5 GBP was spent).

Wooden prefabricated units are often used in the construction of “furniture” enclosure, e.g. toilets or cooking facilities, such as the “kitchen cupboard” in St. George’s Church in Wrotham, county of Kent [3].

4.3. Reinforced concrete as independent structure in adapted church

The opposite of the above-described relatively light and mobile structures is a reinforced concrete roof built over *London Symphony Orchestra St. Luke’s* (F). The building which was subject to adaptation in 1995 was St. Luke’s Church in London with the purpose of becoming the rehearsal hall for *London Symphony Orchestra*. The object had undergone numerous repairs due to the damage caused by ground subsidence. It was deconsecrated in 1959 and for the subsequent 36 years remained in ruins, which considerably deteriorated its technical condition. The application of an independent structure resulted from land and geological conditions, whereas the use of material (reinforced concrete) was imposed by acoustic conditions [1].

5. FORMAL RELATIONS BETWEEN ADDED STRUCTURE AND BODY OF EXISTING BUILDING

New structures within old walls of the presented churches are usually located within the main hall, the chancel is generally left in its unchanged form (A, B, D, E, G, H). If there is the necessity of further development, then subsequently the side aisles are taken over and as a last resort the chancel is taken into consideration (Fig. 3). There is a dependence between the size of a church and the location of a new structure. The bigger the object is, the smaller part of the church is occupied by a new structure. The added structures in the analysed buildings assume different heights – from one-floor (e.g. meeting rooms in St. Andrew's Church in Farnham) to several-floor ones reaching the ceiling or the roof (B, G). In general, architects endeavour to enable the perception of the whole space of the church in the most important vistas – from the floor to the ceiling. This method preserves the former grandiose and expressive character of the building.

The majority of the analysed examples accentuates the longitudinal axis of the church by way the added structure is formed: by means of axial symmetry of the new form (A, D, F, G), breaking the form along the axis (C, E) or its withdrawal (H).

As far as the composition is concerned, newly introduced elements usually contrast with the old substance, however, they may also repeat the divisions (D), resemble the curvature of Gothic arches (B) or copy the outline of the walls (H). On the basis of formal variety of the collected examples one must assume that in spite of its regularity and rigidity the form of historical churches does not limit geometrical liberty of forming newly designed elements – regular cuboidal forms are applied (A, D), bodies composed of freely joined planes of different directions (E, H) and curvilinear geometric shapes (B, G).

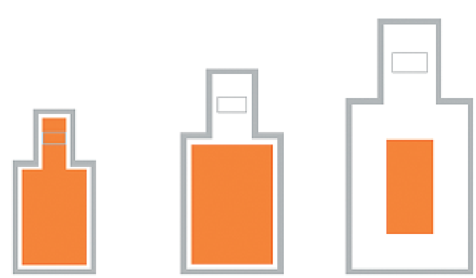

Figure 3.
Formal relations between added structure and a plan of existing building (the altar is marked with a rectangle). Developed by the author

6. SUMMARY

Independent structures are an effective and successful method of the adaptation of sacred objects due to the fact that in most cases they do not interfere with the static balance of the historical construction, give a great freedom of designing within the scope of shaping the form, composition and appearance of the interior. Moreover, their implementation is compliant with actual conservational theory. Necessity to minimize the burden and executive difficulties connected with access to the construction site results in frequent use of light prefabricated structures, both steel and wooden.

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