

## The Sydney Opera House Revisited

Modern Theatres 1950 to 2010

*“It stands by itself as one of the indisputable masterpieces of human creativity, not only in the 20<sup>th</sup> century, but in the history of humankind”.* Expert evaluation report to the UNESCO World Heritage Committee 2007 on the Sydney Opera House. The building opened in October 1973 to universal architectural acclaim. The Sydney Opera House is undoubtedly one of the most important pieces of architecture of the twentieth century.



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But as an opera house and a concert hall it is severely flawed.

Planning for a new performing arts building in Sydney began in the late 1940's led initially by Sir Eugene Goosens, an English composer and the director of the New South Wales Conservatory of Music. The existing Sydney Town Hall was not considered large enough or suitable for many types of live performance.

The government announced an international architectural competition and the guidelines were released in February 1956. These called for a large hall to seat between 3,000 to 3,500 persons designed for

Symphony concerts  
Large-scale opera  
Ballet and dance  
Choral  
Pageants and mass meetings

The small hall should seat approximately 1,200 persons for –

Dramatic presentations  
Intimate opera  
Chamber music  
Concerts and recitals  
Lectures

Jørn Utzon a 38 year old Dane with a small office north of Copenhagen prepared his 12 page entry for the opera house competition it was given the number 218 out of the 233 schemes submitted.

(...)

In January 1957 Premier Cahill announced the winner was Jørn Utzon, a virtually unknown Dane. The jury noted *"because of its very originality, it is clearly a controversial design. We are however, absolutely convinced of its merits"*. The cost was estimated at 3.5 Australian dollars.

The concept for the Sydney Opera House owes much to Utzon's undoubted genius. But he himself acknowledged a number of influences that helped generate his concepts.

(...)

Utzon's winning design consisted of only 12 drawings. It was a sculptural scheme using the stunning location and a building designed to be viewed from all sides. Utzon won the competition on the basis of a few imaginative but undeveloped sketches.

## Design

Once design commenced two problems were almost immediately identified –

- The geology of Benelong Point, the building site, had not been fully surveyed before the competition. It was now discovered that instead of good, stable sandstones the site was largely composed of loose alluvial deposits soaked with sea water and unsuitable to support the weight of the structure. Mass concrete foundations were necessary at significantly increased cost. The second challenge was a lot of unknowns about the roofs. They had not been designed or engineered in any detail.

Politically there was considerable pressure to start construction as quickly as possible to maintain momentum and avoid political opposition. Premier Cahill was in a hurry, he was 68 when construction began. It would have been wise to allow time to resolve design challenges and problems but this would have put the project at risk. In March 1959 construction of stage 1 – the podium – commenced and it was completed in February 1963, two years behind schedule.

The project needed extraordinarily skilled structural engineering and Utzon was introduced to Ove Arup by Sir Lesley Martin and Eero Saarinen. Arup was one of the leading structural engineers of his generation and founder of the practice that still bears his name.

## The shells

While the podium was building Utzon and his design team struggled with the design of the shells. His competition entry had relatively low, linear shells. The auditoriums needed much higher shapes and larger volumes. Between 1958 and 1962 the shell design explored various forms including parabolic, ellipsoid and finally spherical geometry to generate the final form of the shells.

Utzon had a clear vision of the type of shapes he wanted in the shells while Arup and Partners in London struggled to devise a structural solution.

Utzon produced the “red book” which contained a complete set of plans and sections for the Government. But, the drawings in the red book were structurally unsound. Each shell was different and this unique solution would add significantly to the cost and complexity of the building.

As the construction of the podium progressed resolution of the shells became a critical issue. Utzon struggled to develop a rational concept that could be engineered. A major breakthrough occurred when he observed that they could be derived from a single, constant form – a sphere. This would considerably simplify the sails and allow ease of repetition. The “spherical solution” would become the discovery that permitted the opera house shapes and forms to be engineered and realised. In January 1962 Utzon submitted the “Yellow Book”. In 38 pages of plans and elevations this set out the shapes, details of the ribs and the tiling. Its cover showed the principles of the spherical geometry.

## **Construction and disputes**

With the design of the shells resolved, stage 2 – construction of the roof – began in 1963 and took three years. Utzon had moved with his family to Australia in 1963 but relations with the New South Wales government deteriorated. There were problems over rising costs, originally estimated at 3.5 million Australian dollars in 1959, they had risen to 13.7 million in 1962. There were concerns over Utzon’s ability to deliver all of the drawings required for the fitting out and interiors of the project.

In 1963 there were significant changes to the brief for the project. At the insistence of the Australian Broadcasting Commission which ran the orchestra the major hall which was originally to be a multipurpose opera/concert hall became solely a concert hall. All of the stage equipment needed in this hall to accommodate opera and other types of performance were scrapped although a significant amount had already been installed. The minor hall, originally for stage productions only was now required to house opera and ballet and renamed the opera theatre. It is much too small and totally inadequate to stage large scale opera and ballet.

Ove Arup stepped back from the project as he moved towards retirement. Arup’s Sydney office queried Utzon’s ability to deliver the number of drawings needed for stage 3 – the interiors.

A change of government in May 1965 led to further disputes over the cost of prototypes and an impasse ensued. Following meetings in February 1966 between Utzon and the Minister for Public Works, Utzon resigned. There were demonstrations in favour of Utzon and attempts at a reconciliation but the

government moved to appoint a new team led by Peter Hall in April 1966 to take charge of the design of the interiors. Nine days after Hall was appointed on 28<sup>th</sup> April 1966 Utzon and his family flew out of Australia never to return.

January 1967 saw the last pre-cast shell installed effectively completing stage 2 - the roofs. Stages I and II had cost A\$ 13 million to complete.

## **Interiors and Stage Technology**

On appointment Peter Hall and his team found little information on the proposed interiors. He had to undertake research, establish new relationships with the consultant teams and create effectively a new brief for the interiors to fulfil the users and especially the orchestra's needs. They recommended the large hall be designed solely for concerts. Opera was relegated to the smaller hall. In September 1968 Hall and his team advised the Government it would cost a further \$ 85 million to complete. The cost of Phase III considerably exceeded that of the first two phases.

## **Opening and Impact and resident companies**

The first production in the Opera Theatre was Prokofiev's epic War and Peace by the Australian Opera. British lighting designer Robert Ornbo encountered an opera house without adequate lighting positions and a stage simply too small to house large scale opera.

The first performance in the Concert Hall was a program of works by Wagner performed by the Sydney Symphony Orchestra and featuring the legendary Swedish soprano Birgit Nilsson and conductor Charles Mackerra. One month later on October 20<sup>th</sup> 1973 Queen Elizabeth II opened the Sydney Opera House and with British understatement observed *"The Sydney Opera House has captured the imagination of the world, though I understand that its construction has not been totally without problems,"*

In 1957 the project was expected to cost A\$ 3.5 million and be completed on Australia Day (January 26<sup>th</sup>) 1963. The building was completed ten years late at a cost of A\$ 102 million some 29 times over the original budget. Australians often say they have the best performing arts centre in the world, the problem is the exterior is in Sydney at the opera house and the interior is in Melbourne at the Victorian Art Centre.

The Sydney Opera House is now home to seven significant performing arts companies including Opera Australia, Sydney Symphony Orchestra, The Australian Ballet, Sydney Theatre Company, The Australian Chamber Orchestra, Bangarra Dance Theatre and Bell Shakespeare. It is now the largest performing arts centre in Australia and has hosted many performing arts groups from across the world.

## **Impact on 20th century architecture**

The Sydney Opera House is important because it was one of the first buildings to move away from the classical and rectilinear form of civic, public and performing arts buildings. It embraced curves and proposed a challenging structure at the limits of what technology and the construction industry could deliver in the 1960's.

The latter quarter of the 20<sup>th</sup> century has seen other architects continuing this move away from the ordered, straight line and rectilinear with increasingly audacious projects. The work of Frank Gehry, Zaha Hadid and others illustrates this.

In 1999 Jørn Utzon agreed to work to develop a set of guidelines for future changes to the Sydney Opera House. This was a process of rapprochement between the architect and the building that he had never seen. The goal of the design principles was to enshrine Utzon's vision and provide a framework for the future development and renewal of the building to ensure its integrity. Utzon worked on this with his architect son Jan and Sydney-based architect Richard Johnson. Part of this process was the re-design and reconstruction of the Reception Hall. This reopened in 2004 renamed the Utzon Room and is the only interior within the Sydney Opera House designed by Jørn Utzon.

## **Opera House renewal project**

2013 marked the 40<sup>th</sup> anniversary of the opening of the opera house. It was also the start of the building's Decade of Renewal.

In 2016 the opera house announced a series of projects to be enabled by 202-million-dollar of financial support from the New South Wales government. This will: -

- In the concert hall, upgrades to the acoustics, accessibility and stage and backstage areas will be coupled with the replacement of now obsolete and worn out theatre systems.
- The opera theatre now renamed the Joan Sutherland Theatre will have a major renewal including the replacement of its technical systems and equipment, opening up more areas to the public and enhancing where possible other areas.

## **Conclusions**

The Sydney Opera House resulted from an international architectural competition that illustrates both the merits and risks of such a route to select the architect. The brief for the competition was poor – it asked for two multipurpose halls at a time when the world was moving against multipurpose halls and towards single-use spaces – a concert hall and a separate opera house.

Architectural competitions are intended to offer opportunities to new, young, emerging architects. Jørn Utzon was such an architect and he produced a remarkable building. But architectural competitions also carry a degree of risk that a project will be costly, difficult or delayed. The Sydney Opera House was all three.



Having started with a flawed brief there were significant client changes to their requirements during the design and construction of the opera house resulting in massive changes and huge increases in cost. The costs of Sydney Opera House cannot all be ascribed to the innovative roof and shells. The significant cost fell during phase 3 of construction, the fit out of the spaces. “*Form follows function*” is a phrase ascribed to American architect Louis Sullivan. It became a mantra for architects in the 20<sup>th</sup> century. Utzon conceived and designed extraordinary external shapes for the building. The auditoriums and stages had to be squeezed into these shapes. The performance spaces were compromised and will always be compromised.

The Sydney Opera House is perhaps the most extraordinary building of the 20<sup>th</sup> century. It preceded many subsequent organic buildings by Frank Gehry, Zaha Hadid and Santiago Calatrava amongst others. Its influence on architecture in the latter quarter of the 20<sup>th</sup> century is amazing.

Could the opera house had been better if Utzon had been retained and not resigned? An impossible question to answer. The fundamental problem is the shells are too small. Coupled with the clients brief changes Utzon could have produced a more singular piece of architecture but it would still have had practical and functional problems.

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**BTR Ausgabe 6 2017**

Rubrik: English texts, Seite 253

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