IABSE

Guidelines for Design Competitions for Bridges

International Association for Bridge and Structural Engineering

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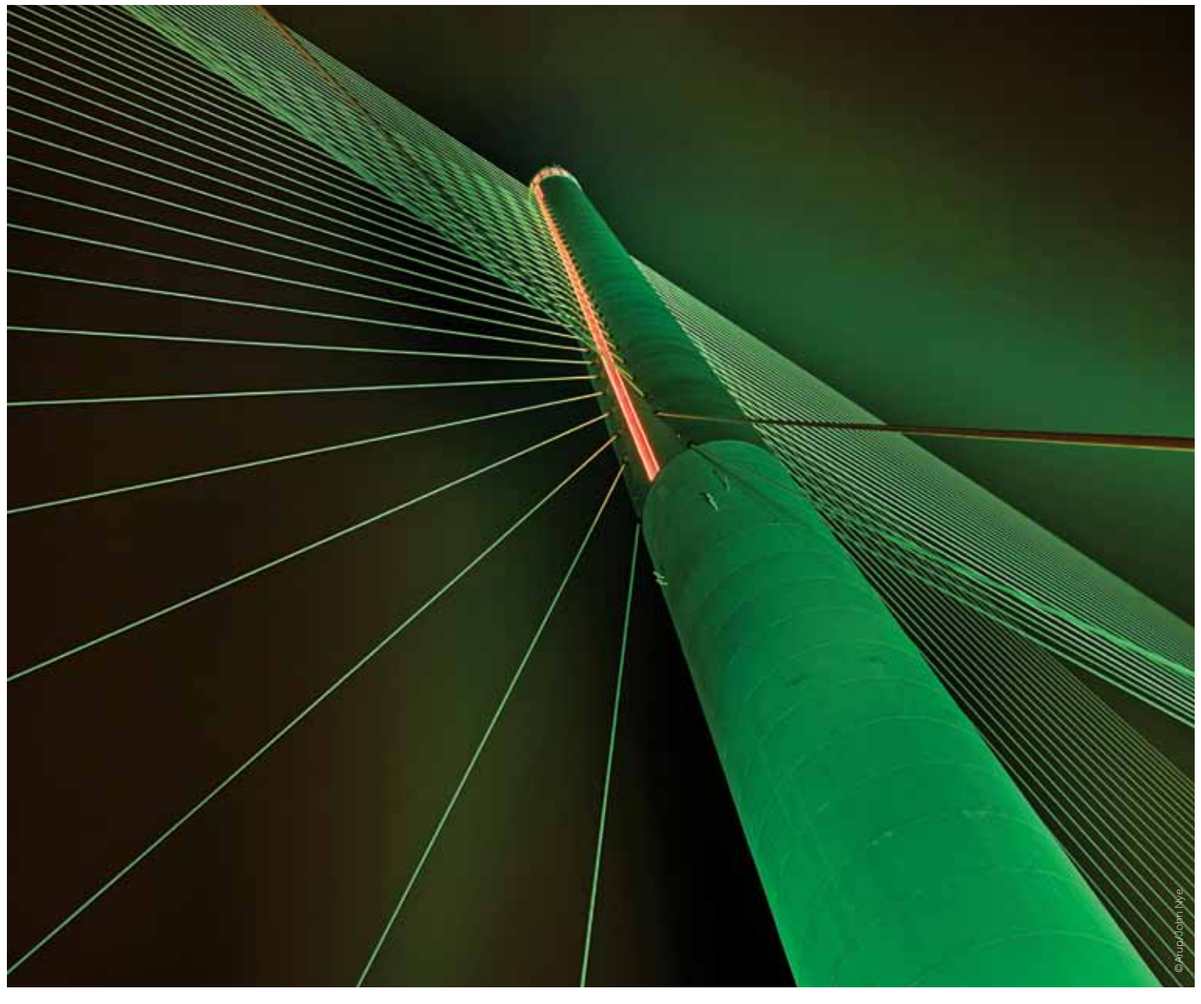

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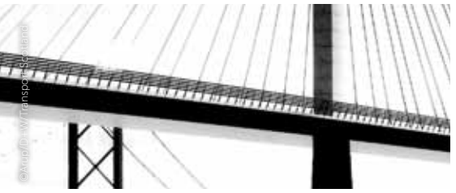

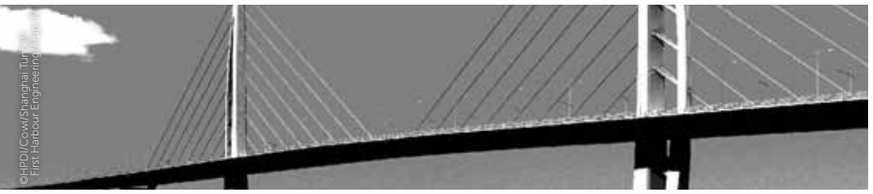

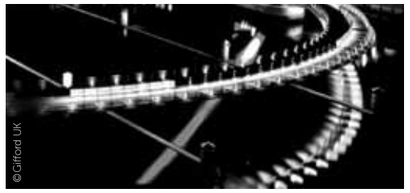

CONTENTS

Preface

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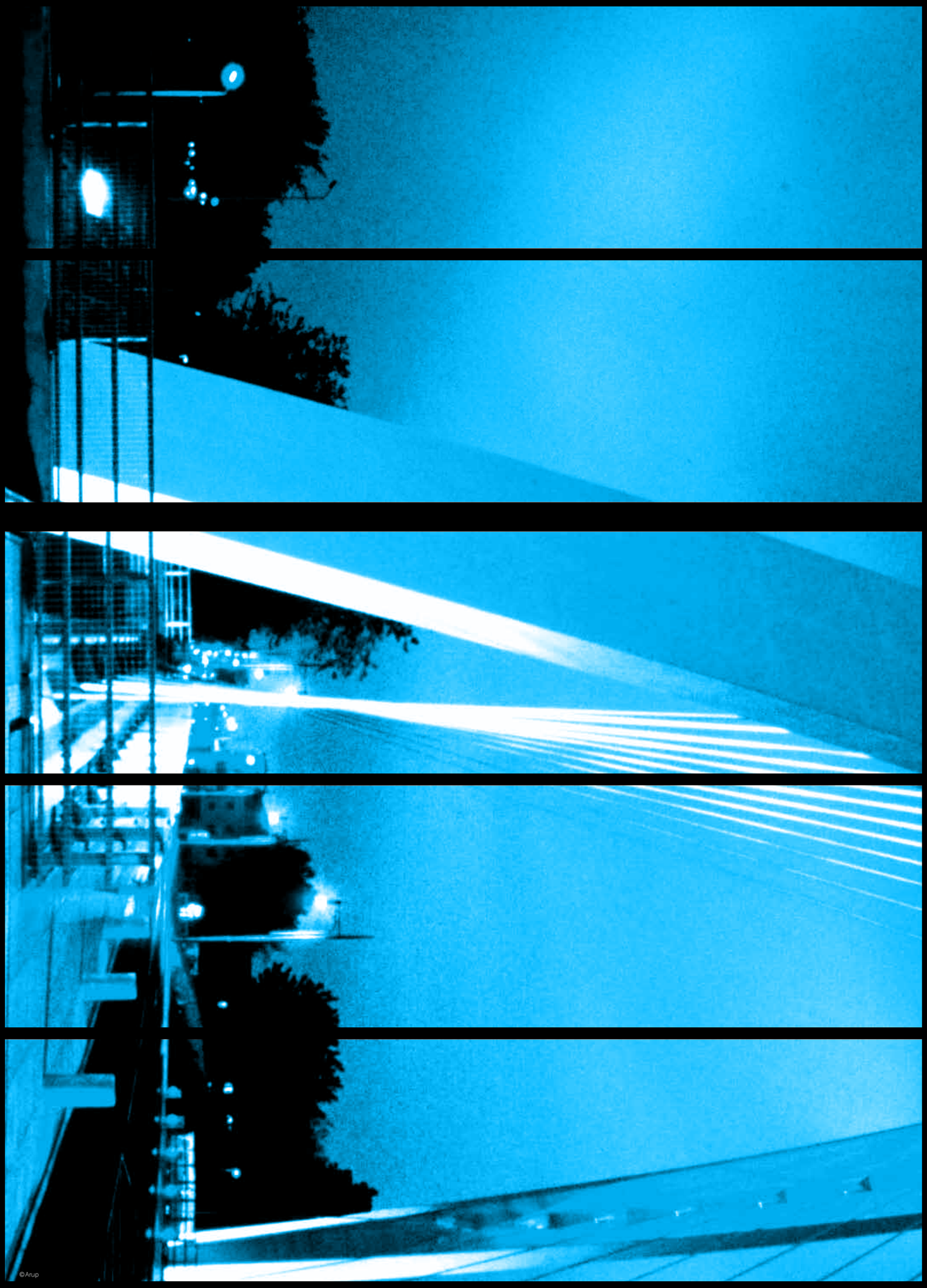
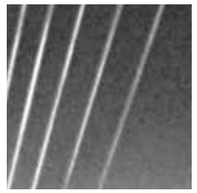
Guidelines for Design Competitions for Bridges



Preface






In procuring bridge projects public sector and government organisations are usually obliged to demonstrate they have achieved value for money. Value for money is frequently interpreted as lowest construction cost, but increasingly, clients are placing greater emphasis on visual quality and are procuring bridge projects via the design competition route.

In recent years clients and the general public have become more aware of the quality of the built environment through improvements in the quality of urban development and visually attractive buildings. This awareness has also turned attention to bridges and other civil engineering structures, and architects have increasingly become involved in their design. Public sector and other procurement agencies have in turn utilised design competitions to satisfy their aspirations for a landmark structure and to acquire innovative and visually attractive bridges.

There have been various forms of competition. Some are design competitions only, where the winner is appointed to develop the design and the bridge is built in the traditional way by a contractor tendering for the construction. Others have been on the basis of a design and build tender with quality included as an essential criterion for choosing the winning design and tender.

Hulme Arch Bridge,
Manchester, UK

The increasing use of design competitions has prompted engineers and architects to work together in developing creative and visually stunning proposals. Sadly, this sometimes results in beautiful images and convoluted designs that are visually attractive, but may be structurally unsound, over budget and expensive, and difficult to build and maintain; but if conceived and developed within the right framework can meet all the aspirations of the Client and offer real value for money.

Many competitions have run into trouble or have had unsatisfactory outcomes. A frequent feature of these competitions is that a promoting authority is charged with running a design competition which it has never run before and is very likely never to run again.

Designers including both engineers and architects with experience may enter these design competitions, but there may be entries from designers with little or no experience of bridge design. The result in some instances is a design being chosen that is visually stunning but unsound in terms of structural behaviour, cost or respecting the particular environmental and other constraints of the site. The adoption of an unsound design can be due to any one of a number of factors such as an uninformed promoter, an inexperienced competitor, ill-conceived rules or an inexperienced and unknowledgeable judging panel. However many competitions result in new ideas proposed by talented and emerging younger engineers and architects that can be developed and implemented successfully in conjunction with experienced engineers and architects, if the competition is properly conceived and managed.

Some countries have rules and systems to ensure that unsound designs are not chosen, but even in these countries designs can be chosen that do not result in a satisfactory design.

In an attempt to assist Clients and procurement agencies to achieve a successful outcome from a design competition, two groups of engineers and architects within IABSE took the initiative to write Guidelines for Design Competitions. The first initiative came from a proposal at the 2006 IABSE seminar in Budapest for "Guidelines for Design Competitions for Bridges" to be written by IABSE, which resulted in the setting up of Working Group 3 (WG3) to write the guidelines. A second independent initiative came from the British Group of IABSE at the Henderson Colloquium in July 2007. The Henderson Colloquium was attended by experienced engineers and architects both from UK and elsewhere, and three members of WG3 also attended that Henderson Colloquium. WG3 first met in Weimar, Germany, in September 2007. At the meeting it became clear that the objectives of WG3 were closely aligned to those of the Henderson Colloquium. The WG3 agreed that the guidelines being prepared by the Henderson participants could be developed into the IABSE Guidelines.

Øvre Sund Bridge,
Drammen, Norway

Until now there are no published international guidelines available to clients and procurement agencies wishing to hold a bridge design competition. UNESCO in 1978 published design guidelines intended for architecture and town planning, but these have rarely if ever been applied to bridge design competitions.

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IABSE Working Group 3

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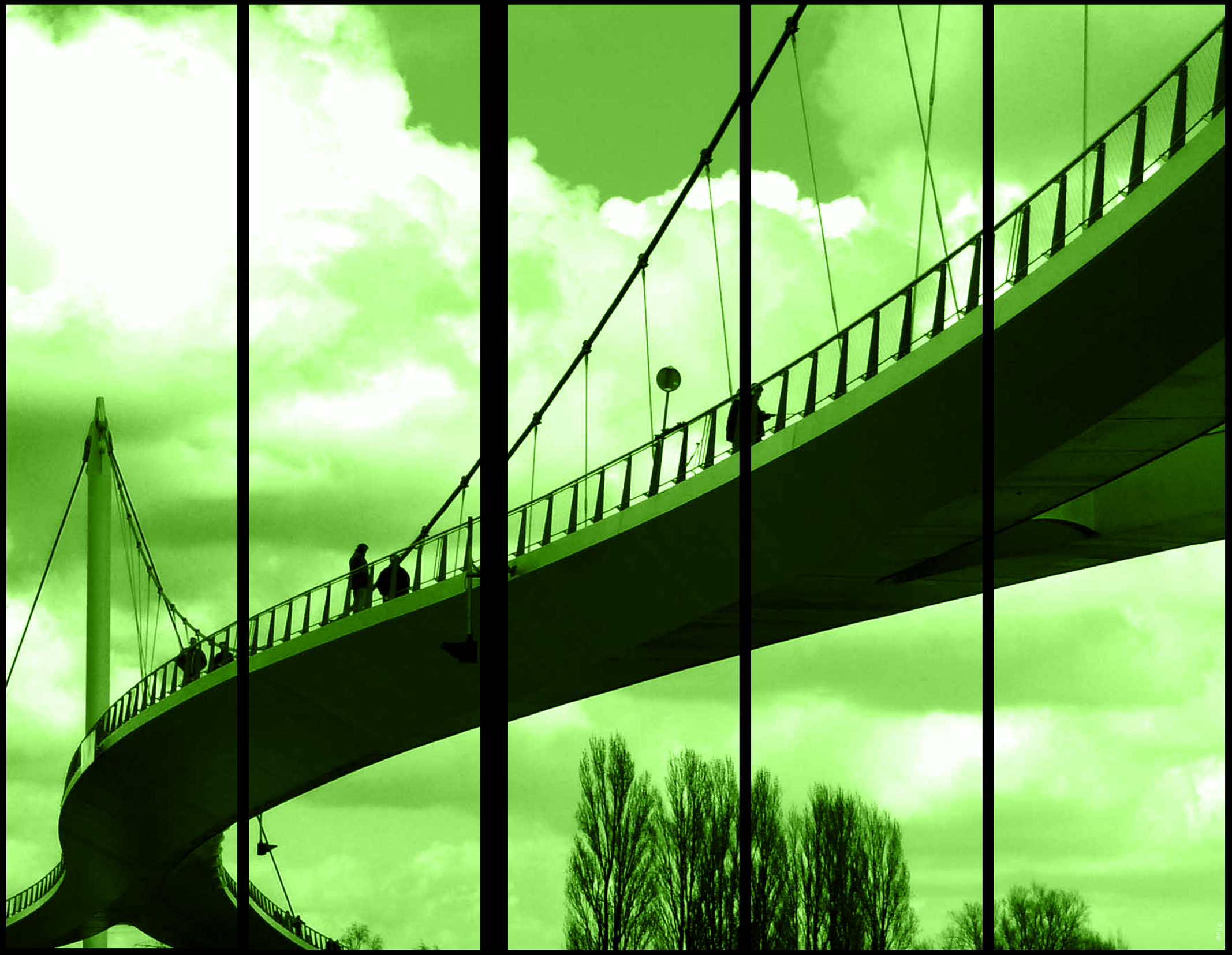
Guidelines for Design Competitions for Bridges

Purpose of the Guidelines

1



Purpose of the Guidelines

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©Arup/Michael van Oosten

These Guidelines are written specifically for projects in which a bridge is the main element of infrastructure but can also include related items such as the approaches to the bridge and its landscaping etc. The Guidelines are for the client's benefit and the purpose of the Guidelines is to give a framework for clients to procure a bridge project successfully via a design competition route.

Design competitions by their nature encourage creativity and innovation and help a client to select a design that meets his particular needs.

The Guidelines are general and intended for clients who can modify and tailor them to suit their requirements.

Competitions entail expenditure of considerable time and money by designers, and it is expected that competitions based on these guidelines will encourage designers to take part with assurance that their submissions will be judged in a professional and impartial manner, and that they will be rewarded appropriately for their ideas.

An efficient, open and fully-audited process with well written briefs, clear rules and fair conduct is essential in promoting and safeguarding goodwill with the public, local authorities, funding agencies and other key stakeholders.
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Nesciobrug, Amsterdam, The Netherlands

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Guidelines for Design Competitions for Bridges

Why use a Design Competition

Why use a Design Competition

There may be several reasons for procuring a bridge via a design competition route, some of which may be:

- The bridge is sited at a landmark, commemorative, environmental or politically sensitive location
- The bridge should complement the local building culture
- The bridge may be part of a development and the developer wants to publicise the development by means of a visually unique and beautiful structure
- The owner wants to acquire a bridge that has interesting and/or innovative features and can be acquired within his budget
- Gives an opportunity to put a locality on the map and bring attention to it by a landmark structure
- To obtain a sustainable design
- To improve the visual quality of a location
- Obtain best value for money
- Special constraints, unusual site, budget, means of construction and operation may require a non-standard solution
- Help an inexperienced client to acquire a unique or visually interesting bridge
- To select an appropriate design team for a project *IABSE*

Øresund Link,
Copenhagen (Denmark)
Malmö (Sweden)

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Guidelines for Design Competitions for Bridges

When a Design Competition is not appropriate

3

When a Design Competition is not appropriate

Gateshead Millennium Bridge, Newcastle, UK

An example of a successful competition

Ting Kau Bridge, Hong Kong

An example of a successful competition

If none of the criteria in Section 2 apply or the following criteria apply, then it may be advisable not to proceed with the Design Competition route for procurement of the bridge.

- The site is suitable for a standard type of bridge
- There are no unusual engineering requirements and visual quality is not an important consideration
- When a promoter is unable to accept the risk that the option selected by the jury may not be preferred or accepted by the promoter
- The promoter's budget for the procurement process is insufficient to justify the expense of running a competition
- When a promoter already has a suitable designer on board
- When the cost of the bridge is the primary factor in the procurement of the bridge
- When the promoter does not have funding in place or is not confident of securing funding for construction of the project *IABSE*

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Guidelines for Design Competitions for Bridges

Parties and their motivations

4

Parties and their Motivations

The various parties in a design competition have different reasons for engaging in the competition. Some of the principal motivations for each are summarised below.

4.1 The promoter

- Wants a high quality design for the site
- May want to demonstrate concern for the quality of the public realm or the environment
- May want public involvement in the process
- May want publicity for the project or the location
- May want publicity for the promoting body

4.2 The promoter's advisers

They may be employees and/or external consultants employed by the promoter for developing specifications, technical scrutiny, for costing or for other aspects. They want a satisfactory outcome for the competition. Often they are included in the jury as voting or non-voting members.

4.3 The experienced competitor

- Wants to win the commission
- Wants to demonstrate their flair or innovation
- Wants to maintain their reputation as a capable designer
- Wants to be seen to be in the front rank of bridge designers
- Wants opportunities to stretch their staff
- Wants to develop relationships with other team members

4.4 The less experienced competitor

- Wants to win the commission
- Wants to gain a reputation as a capable designer or innovator
- Wants to be seen to be competing in the top rank
- Wants opportunities to stretch their staff
- Wants to build their portfolio of references
- Wants to develop relationships with other team members

4.5 The contractor (for Design & Build only)

- Wants to win the construction contract
- Wants to be recognised as a contractor who is able to manage and deliver a bridge with a sensitive / special design

4.6 The jury member

- Wants a high quality design
- Wants to serve the interests of any constituency relevant to them
- Wants to gain or maintain recognition as an expert in bridge design
- Wants to broaden his business network

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London Millennium Footbridge, UK

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Guidelines for Design Competitions for Bridges

Types of competition

5

Types of Competition

The types of competition may vary from locality to locality and from country to country, but the competitions can be tailored to help the client to find a design team or find a design solution or combination of both a design team and design solution.

If a firm outturn cost is an important issue then a design & build tender with design as a major element should be considered.

The types of competition can be:

- Open, shortlisted or invited
- Single or multi phase
- Ideas only or Full Design

This can be sub-divided as follows:

- Selecting a Design Team
- Selecting a Design Solution: The invited competition
- Selecting a Design Solution: The ideas competition
- Selecting a Design Solution: The open competition
- Selecting a Design and Build contractor

Tradeston Footbridge, Glasgow, UK

5.1 Selecting a design team: The competitive interview or dialogue

An effective way of selecting a design team for their design capability rather than a design solution is to hold a competitive interview or dialogue.

This approach can be used if the client lacks the time or funding necessary to have a comprehensive design competition or if the client is unsure of the total requirements of the bridge, or if the client wants to contribute to the development of the design through a continuous dialogue with the design team.

Again as for the invited competition a selected number of up to say a maximum of four design teams can be invited to compete against each other, on an equal and fair basis, in pursuit of design of the highest quality, but do not need to submit design work. The team should be selected on the basis of:

- Their experience and their approach to the particular project
- Client's confidence in his ability to work with the design team and be involved in the project
- Client's confidence in the design team
- Budgeted fee

If the design team consists of engineers and architects then the design team should be led by a person with experience of bridge design and construction, who is normally an engineer.

5.2 Selecting a design solution : The invited competition

If it is desired to obtain designs from bridge designers of established reputation, then an invited competition can be held.

The design teams can be selected in a number of ways.

- May already be known to the client
- Advertise an outline of the project and invite interested design teams to submit details of their relevant personnel and experience, and choose the competitors from the submitted list. In effect this is a multi-stage but focussed open competition

It is recommended that a maximum of six design teams are chosen to take part in the competition and each design team should be paid an honorarium for their submission to the minimum requirements. For the winner of the design that is chosen for implementation, the honorarium could represent an advance on the design fee should the winner be appointed to undertake the detailed design. If the winner is not appointed to undertake the detailed design then the honorarium should relate to the quantity and extent of the submission to compensate the winner for transferring the copyright of the design to the client.

5.3 Selecting a design solution: The ideas competition

If at an early stage in a project the client is looking for a range of possibilities and ideas within a loose framework of requirements, then an open or invited ideas competition can be held.

The open ideas competition can be open to students as well as qualified professionals who can be architects and engineers. Prize money should be awarded to say the chosen top six designs.

Lockmeadow Bridge, Maidstone, UK

An open ideas competition can have more than one stage with selected designs being developed to a higher degree.

An open ideas competition can be advertised either nationally or internationally in the architectural or engineering press or by other means. Any design team should be able to apply for the competition documentation and then submit conceptual designs.

Like the open competition, the open ideas competition may not be attractive to practising and experienced engineers and architects, unless there is reasonable prize money.

5.4 Selecting a design solution: The open competition

If there is a commitment to build and selection of a single solution is desired from a maximum range of potential designs, then an open project competition is a recommended route. But there is a possibility that a very large number of entries will be received, and the client needs to recognise the additional work involved in reviewing these. The client will therefore need to set-up a well thought out process on how to publicise and set out the rules of the competition and how the entries will be received, stored, catalogued and judged. *continue*

Jiubao Bridge, Hangzhou, China

The open project competition enables the widest possible range of solutions to be obtained. A competition of this kind will result in solutions of varying imagination and quality and some designs may be of high quality.

If designs require more detailed scrutiny or a dialogue is required with potential design teams to develop the submitted designs, then a second stage in the competition is recommended. At the first stage a limited number of designs can be selected, which can then be developed at the second stage.

If there is only one stage, then it would be equitable to pay prize money for the first second and third choice.

If there are two stages, then a number of designs preferably only four or five can be selected for development to a second stage. The selection of the design to be implemented can be made at the end of the second stage, with prize money being awarded to all the competitors.

An open competition can be advertised either nationally or internationally in the architectural or engineering press or by other means. Any design team should be able to apply for the competition documentation and then submit conceptual designs.

It should however be noted that an open competition may not be attractive to practising and experienced engineers and architects, unless there is a high level of experienced scrutiny in the judging and there is reasonable prize money, or a commitment to appoint the winner to develop the detail design.

5.5 Selecting a Design & Build contractor via a design competition route

If it is desired to procure a design where the construction is planned with the design, then a team which will be a combination of designers and builders (contractors) will need to be selected on a Design & Build basis.

In this method the design selected for construction can be based on a number of parameters such as:

- Type of bridge
- Addressing of environmental political and other issues as defined in the brief
- Technical merit
- Constructability
- Maintainability and Whole Life Cost
- Aesthetics
- Cost
- Track record of designer
- Track record of builder

The design & build teams can be selected from advertising an outline of the project and inviting interested design and build teams to submit details of their relevant personnel and experience, and choose teams from the submitted list to take part in the design and build tender (competition).

It is recommended that three to four design & build teams are chosen to take part in the competition and each team should be paid an honorarium for their submission to the minimum requirements. For the winner the honorarium could represent an advance for their design and build fee.

The promoter should make a commitment to appoint the winning Design and Build Contractor and have funding available for the design and construction of the project. Without this commitment Design and Build contractors will not be interested in the competition.

On the basis that quality of design is a major consideration for the client, the selection of the winning competitor should be based on a combination of quality marks and price with quality marks being the major factor. Refer to 8.2.3.

A two-phase or a competitive dialogue system in which design solutions are part of the selection process will enable the client to retain control over the design quality.

If price is the only major consideration then these Guidelines are not applicable to the procurement strategy of the client.

5.6 Tailored competitions

Many clients may wish to procure a project by combination of means outlined above. Some of the possible combinations could be as follows:

5.6.1 Conduct competitive dialogue first to arrive at a shortlist of design teams, followed by an invited design competition to select a winning solution.

5.6.2 Invite a number of design teams selected from submission of experience alone or through competitive dialogue and ask them to take part in a design competition. The winning team should then be asked to develop the design to a high degree of completion, where the general arrangement and outline dimensions of the bridge are approved by the client and interested statutory bodies. Construction contract can then be let on a design and build basis for a fixed price or fixed price plus re-measurable items, with the contractor carrying out the detailed design.

5.6.3 Select a design team by competitive dialogue. Ask them to develop a number of design solutions and develop a design or designs to a high degree of completion, then follow the procedure as outlined in 5.6.2.

5.7 Rules and regulations

Many public sector or public sector-funded projects must follow the detailed procedural rules, laws and regulations of a country. The competition can be held within these rules with appropriate application of the procedures and advice contained in these Guidelines. *IABSE*

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Guidelines for Design Competitions for Bridges

The components of a successful competition

6

The components of a successful competition

There are several components that need to be addressed for a competition to bear successful results. Some of these include:

- Aesthetically pleasing structure
- Embedment in the local urban or rural context and landscape
- Public acclaim
- Delight
- Appropriate cost
- Delivery on time and within client's budget
- Minimum and/or appropriate design and construction period
- Overall durability and robustness
- Easy to inspect and maintain, low maintenance costs
- Minimum and/or appropriate environmental impact
- Appropriate sustainable design
- Publicity to draw attention to the project and attract funding

The components that will contribute to a successful competition and result are:

6.1 The client clearly understands why he is calling for a competition and what his objectives are.

6.2 The client chooses the type of competition which best suits his needs and circumstances.

6.3 The type of competition needs to be chosen which meets all the aspirations without incurring undue costs.

6.4 Clear definition of commercial constraints such that all parties understand the commercial proposition.

6.5 There is an equitable and reasonable balance of risk and reward for the client and the competitor.

6.6 The client has carried out a feasibility study and clearly expresses his requirements with well researched and defined criteria, wishes, realistic aspirations and realistic budget.

The client should appoint an experienced and respected independent consultant to help with the compilation of the requirements and the brief, and scrutinise the entries and advise the jury who will undertake the judging of the competition, on the technical merit and likely out-turn costs of design approvals and construction cost.

6.7 The client provides comprehensive and adequate data, such as relevant legislation, local planning strategies, land take, historic context, geographic, geological, ground investigations, environmental and cultural context, area plans, topographic surveys, hydrological data, technical regulations, approval procedures, competition rules, timetable, payment proposals etc.

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Tri-Countries Bridge, Weil Am Rhein, Germany

6.8 The competitors are comprehensively briefed on the client's requirements and aspirations.

6.9 There is sound engineering input to the design and the designer can demonstrate that the design is structurally sound and buildable.

6.10 The client appoints a jury that has the ability and knowledge to judge the entries, refer to Section 8.7.

6.11 The jury is appointed as early as possible and is comprehensively briefed on the client's requirement. The jury must agree with the brief and with the client's requirements and aspirations.

If possible involve the jury in writing the aspirations for the brief. The aspirations should be limited to statements that the jurors and client can agree on.

6.12 The jury impartially uses the client's criteria and requirements to recommend their choice in a fair and transparent manner.

6.13 The jury has the ability to recommend with reasons a design that departs from the brief but has merits that go beyond the brief

6.14 The client's independent consultant should vet the design for engineering adequacy and provide expert technical assistance to the jury in evaluating the technical performance costs or other queries on the design that are raised by the jury.

6.15 At least one entry satisfies the scrutinising procedure.

6.16 At least one of the entries satisfying the scrutinising procedure responds positively to the full scope of the requirements and presents its ideas clearly.

6.17 The winning design is well received by the public. *IABSE*

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Guidelines for Design Competitions for Bridges

The ingredients of an unsuccessful design competition

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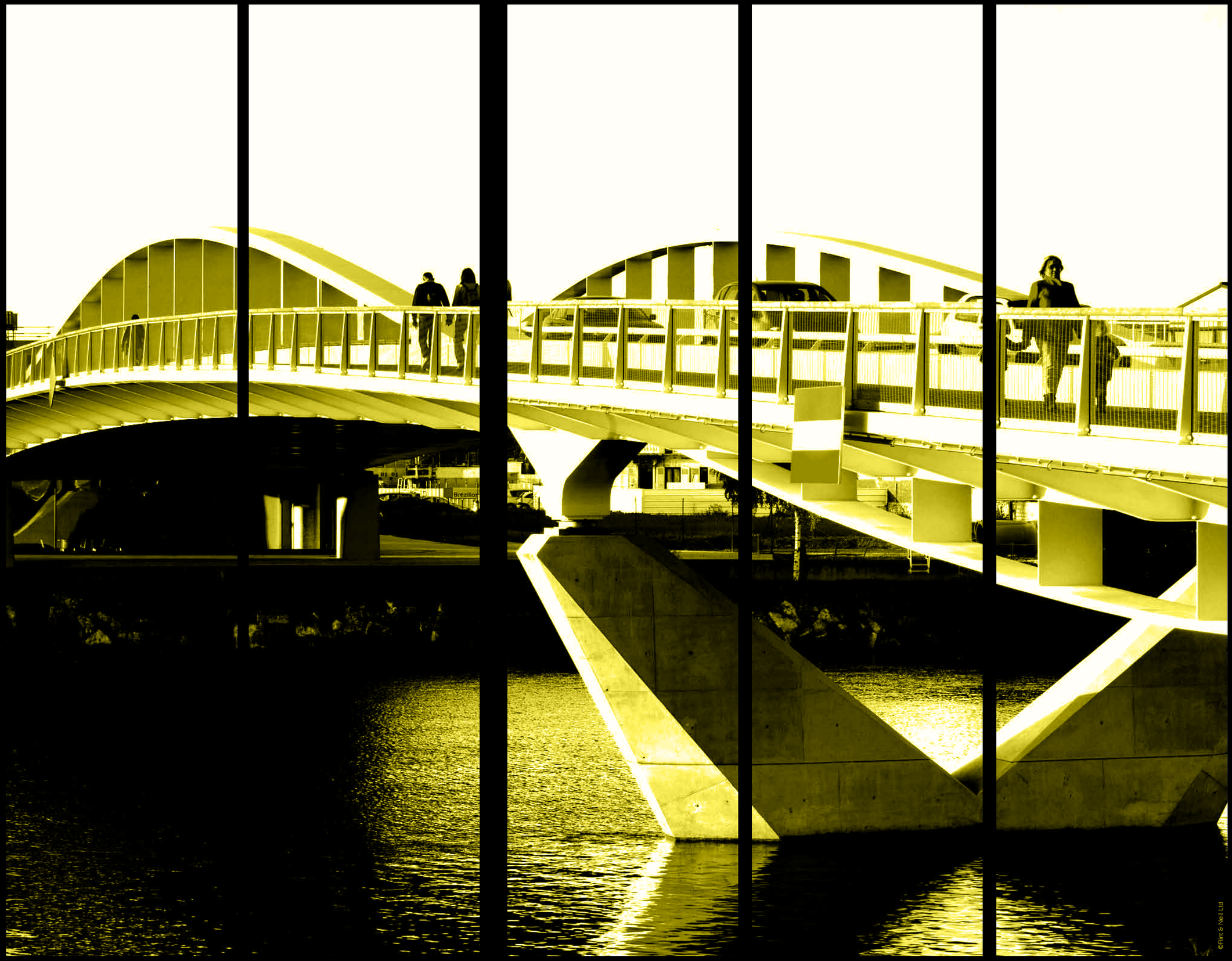

The ingredients of an unsuccessful design competition

Forth Replacement Crossing, Edinburgh Scotland

An example of a successful competition

7.1 The client is unclear about his objectives and has conflicting requirements.

7.2 The client provides inadequate or ill-researched data and a poor brief.

7.3 Insufficient prize money or rewards to attract serious competitors and hence submission of poor or inadequate designs.

7.4 The client appoints a jury that does not have the required ability and is not served by an independent consultant to vet the submitted design and provide impartial assessment of the engineering soundness of the submitted designs and likely costs of construction.

Danube Bridge, Linz, Austria

An example of a successful competition

7.5 The jury selects a design that is visually interesting but does not work structurally or in other engineering aspects.

7.6 The jury selects a design that does not meet the client's budget. The cost may exceed the budget as a result of additions needed to meet the technical requirements.

The remedy for this is to have a thorough technical scrutiny of the entries and for the construction cost to be evaluated on a common basis by independent and experienced consultants appointed by the client. Another remedy is to use the Design and Build form of design competition.

7.7 The jury selects a design which is not the one which best satisfies the brief. The remedy for this is to sufficiently involve the client and to involve some of the jury in the writing of the brief. Members of the jury appointed subsequently should also buy into the brief and the aspirations of the client.

7.8 The client does not accept or respect the advice of the jury or independent consultant.

7.9 Not all relevant data has been provided in the brief. The winning design is then found to be incompatible with the data collected after the competition. This may result in abandoning of the design or considerable changes to it. The remedy is to ensure that all relevant data has been collected and written into the brief issued to the competitors.

7.10 The winning design later incorporates ideas and components of the loosing designs.

Design competitions usually throw up many interesting ideas which may not be part of the winning design. It is logical and understandable that ideas of the loosing designs are incorporated in the execution of the winning design. This, however is unfair to the losing entries.

The remedy is to respect the intellectual property of the entrants and pay the entrants adequately for their effort, provided they fully satisfy the submission requirements. Alternatively the client must give an undertaking that they will pay sufficient and equitable compensation to the losers if their ideas are used in the execution of the winning design. This requires that the copyright of the designs must remain with the entrants unless it is specifically purchased from the designer. *IABSE*

Dongman Bridge, Shenyang, China

An example of a successful competition

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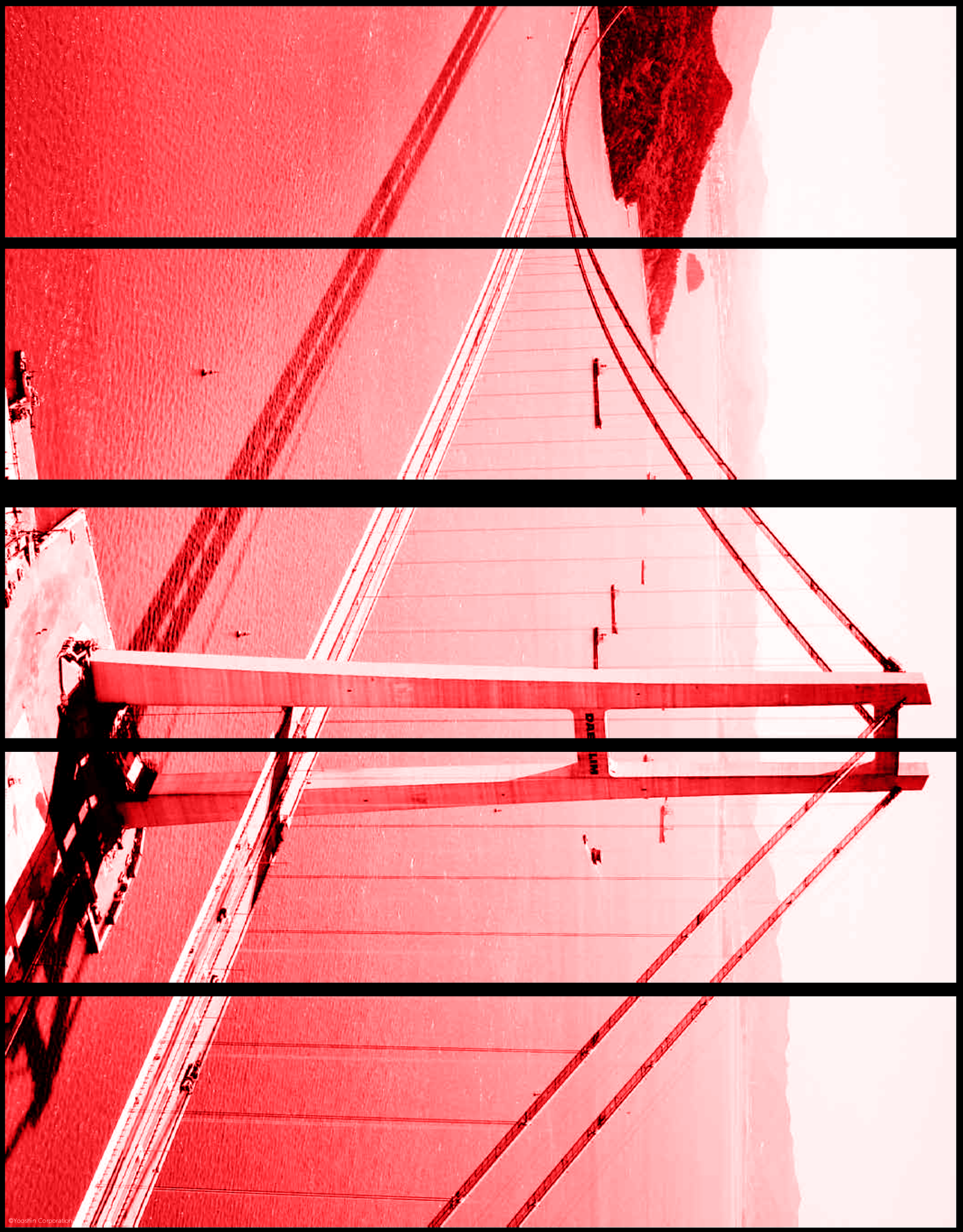
Guidelines for Design Competitions for Bridges

The stages of a competition



The stages of a competition

Bridge across the Mulde River, Pouch, Germany

8.1 Planning, feasibility study and pre-competition activity

This includes the following:

- Client project plan for the whole project which includes the bridge
- Identifying the location of the bridge and the requirements for landscaping and local context
- Environmental and political issues etc researched and identified
- Visual and social issues researched and identified
- Public Relations exercise carried out to obtain public support for the project
- Establish political commitment. How is funding to be provided and clarity about procurement strategy
- Identify and consult stakeholders, understand and address their concerns and obtain their commitment
- Undertake comprehensive data collection like topographical surveys, geotechnical surveys, environmental surveys, utilities information etc
- Appoint a competent bridge design consultant to help in the master planning process, establish that a bridge is needed and in conjunction with the client establish the requirements for the bridge
- Identify the reasons for running a competition
- Selecting staff or independent consultants needed to write the brief and run the competition
- Selecting the Type of Competition
- Selecting and appointing members of the competition jury

8.2 Writing of the competition brief

This includes aspirations, technical specification, comprehensive data relating to the site and the wider context. It includes the following:

- Clear definition of client's requirements and aspirations – including aesthetics, structural efficiency specifications, maintainability, construction budget and whole life cost and the priorities attached to them
- Historical, cultural and environmental context
- Technical requirements, codes and standards and particular requirements such as navigation clearances or constraints on access and construction
- Key stakeholder requirements must be clearly spelt out
- Ensuring that there are no contradictory requirements. This means examination of all requirements from the various agencies and stakeholders and ensuring that conflicts are discussed and resolved. This should result in clarity and no ambiguity in the requirements
- Ensure that national and international legislative and legal frameworks have been addressed, including Construction Design and Management (CDM) regulations or equivalent national Health and Safety regulations etc
- Comprehensive data included such as topographical surveys, geotechnical surveys, environmental surveys, utilities information (refer Section 6.7)

The above list represents the ideal and as much of it as possible should be included in the brief.

8.2.1 Establishing the budget

The baseline budget including design competition, detail design and construction must be established taking into account the following:

- Define scope – what is included. Extent of landscaping, architectural lighting etc
- Get a competent bridge design consultant to carry out a feasibility design and establish a budget based on the feasibility design. Benchmark this against projects of a similar nature. Then add an extra allowance for unique designs or construction requirements
- Establish a realistic budget for design based on the design requirements
- Cross check and do a risk assessment on whether budget and money available meets the client's requirements and write the Brief requirements accordingly
- Do not have unrealistic low budgets that fail to meet the client's requirements and aspiration. This is one of the major causes of failure of design competitions
- Help the client in researching procurement regulations and alternative sources of funding
- Bear in mind that to design a bridge of any size or complexity an engineer or architect needs to have served time working on similar projects. The pool of appropriate experienced competitors can be limited both nationally and internationally and this should be considered appropriate to the circumstances. However upcoming and fresh talent can contribute to progress and innovation and depending upon the circumstances appropriate rules should be established to realise the design acquired through an open competition or ideas competition. This could be in the form of mentoring/reviewing, or collaboration with more experienced bridge designers

8.2.2 Establishing the submission requirements

- What to ask for, minimise the amount of submission requirements. Submission requirements must be realistic, given the time and potential prize money made available. It is more important to ask for only a limited amount of important submission material and concentrate on achieving consistency of submission quantity between competitors for comparison purposes rather than getting lots of material
- Number and size of drawings, images, bearing in mind that it is a design contest and not a presentation contest
- Physical model or not
- Computer graphics / fly-bys or not
- Define the submission of technical reports, including evidence of appropriate engineering calculations, erection sequence etc
- Presentation requirements by competitors
- Cost estimate – how detailed – how verified
- Prize money must be sufficient to cover the level of detail and information requested, and be an incentive for experienced designers to take part in the competition. Refer also to Section 8.2.5

For a design competition, the level of quoted fee should not be the governing factor in deciding who should be appointed to carry out the detailed design. The budgeted fee should be adequate for the designer to undertake the design to the quality desired by the client.

- If competitors are asked to quote a fee for doing the detailed design within the established budget provided by the client, the quoted fees must be held in a sealed envelope and only the quality winner's envelope should be opened after the choice of the winning design is known *continue*

The stages of a competition

- The amount of material requested should be balanced against the number of entries expected, to allow the jury sufficient time to consider each entry in full
- Submissions should ideally be anonymous i.e. the competitors should not be able to be identified. This is to ensure that the jury can judge in an unbiased manner. Alternatively the competitors could be invited to present and explain their proposals to the jury before the proposals are judged

8.2.3 Judging and evaluation criteria

Set out the evaluation criteria which should include the following:

- Compliance with the spirit of the Brief
- Realistic criteria which could include environmental considerations, aesthetics, embedment in the local context, technical robustness, innovation, constructability, inspection and maintainability , programme, costs including rules for whole life costs, experience of designer / contractor (if being evaluated)
- Marking system, and percentage marks allocated to various items as stated in the above bullet point are clearly set out in the submission requirements. Marks allocated to the various items by the jury must be clearly identified and transparent
- The choice of marking system is particularly important for D&B tenders. When quality is marked directly, there is a tendency for juries to mark within a narrow band, and it has a small effect on the outcome. To ensure that bidders take full account of quality, the entries should be ranked with the top entrant receiving 100% of the quality marks and the bottom entrant receiving none

8.2.4 The timetable

Establish a realistic timetable to match:

- How much time to allow in each phase, not too long and not too short
- The aspirations of the client. If more detailed information is required then more time is required
- The submission requirements, allow time for development of the solution as well as for compiling presentation material
- The overall procurement and project programme

The timetable should identify a time window for queries by the competitors.

Yi Sun-sin Bridge, Jeollanam-do, Korea

8.2.5 The prize money

In order to attract serious and experienced design teams to compete, it is essential that there is equitable prize money awarded to the competitors. The following needs to be taken into account in establishing the amount of prize money.

- Recognition that there is a difference between prize money and fees. Fees are payment for work done, but prize money is a reward for the high risk of loss of investment endured in entering design competitions
- Recognition that the senior and best expertise of the competitors will be deployed on the competition
- Prize money for ideas only or for subsequent appointment for design development or detailed design. If there is no intention of subsequent appointment then ideas only prize money needs to be set at a sufficiently high level and competitors should be informed if there is no intention of subsequent appointment
- Prize money to reflect and be commensurate with submission requirements and estimate of design team manpower to be deployed and cost of graphics, computer fly-by, physical models etc
- If shortlisted type of design competition is used, then all final stage competitors should be paid an appropriate prize, provided the minimum submission standards have been met
- Forward fee mechanism should ideally be avoided as this does not enable the designer to recoup the expenditure for work already done. Forward fee means that the winning competitor is expected to recoup some of their expenditure in the subsequent phase of the project, on the basis that the winning competitor will be appointed for the next phase. This mechanism is unattractive to designers as considerable expenditure can be entailed in a design competition and there is no guarantee of a subsequent phase. If forward fee is to be adopted then it should be sufficiently high to attract experienced designers to take part in the competition

For a competition with extensive submission requirements, the appropriate prize level could be set as high as the typical proportion of a full design fee that would normally be payable for the concept design stage in a conventional appointment expressed as a percentage of the construction cost. The prize level could then be evaluated on a pro-rata basis depending upon the extent of the submission requirements compared to a conventional concept stage submission requirements.

8.3 Intellectual property issue

Define the intellectual property to be established taking into account the following:

- Respect the designers' copyright
- All competitors must have a design copyright, not just the winner
- If any design ideas from any of the competitors are subsequently used in the design developed for construction and those competitors are not involved in the design development, then adequate compensation must be made to the competitors not involved

8.4 Advertisement

Advertising for Expression of Interest.

Advertising can be placed in national and international technical press, and by notifying the trade sections of embassies and consulates, notice in Official Journal of the European Union and similar national equivalents. *continue*

The stages of a competition

8.5 Expression of interest document

The documents setting out the requirements for Expression of Interest in itself needs to be appropriately compiled taking into consideration many of the issues outlined in these Guidelines. The documents should state the requirements of the information requested, the marking criteria and mechanism for selection of the competitors.

8.6 Selection of competitors

The competitors must be selected taking into account the Type of Competition and the stated selection criteria.

8.7 Selection of the jury or judges of the competition

The number of jury members should be limited and the members of the jury should be selected taking into account the following:

- Should represent spread of disciplines required for the project
- There should be a broad representation
- There should be client representation
- Should include stakeholders and members who understand the local issues
- Should include members who understand and have first hand experience of appropriate bridge design, construction and maintenance
- Should include members with a reputation for aesthetic appreciation, understanding quality in the built environment and in the public realm
- Need for balance between architecture oriented members and engineering oriented members
- Majority of the jurors should be engineers
- Should include members who have experience of bridge construction and costs
- Should include members who have experience of inspection and maintenance
- Should include members who have experience of taking part in design competitions
- Avoid celebrity jurors, or the single agenda body
- Consider jury to be approved by the competitors
- Pay the jurors well to get jurors of appropriate experience and high quality

The composition of the jury should be tested against 'The ingredients of an unsuccessful design competition" stated in Section 7.0.

In some countries there are established government procedures for selection of juries. The recommendations made in these Guidelines could be suitably adopted taking into account national characteristics.

8.8 The competition phase or period

Adequate time depending upon the submission requirements should be allowed for the competition period.

8.9 The receipt and scrutiny of entries

The entries should be checked to ensure that competitors have made submissions that fulfil the minimum requirements.

The entries should ideally be on an anonymous basis. Only the client's project manager should be authorised to know the identity of the competitors and the project manager should check for completeness of the submissions before they are submitted to the jury for assessment. The project manager may manage the process but must not take part in the judging itself.

The project manager should also receive the fee proposal, if any, and keep safe and sealed for opening after the winner has been announced.

8.10 The judging process

The evaluation of the submissions should be judged against the evaluation criteria and tested against "The ingredients of an unsuccessful design competition" as stated in Section 7.0.

Should the jury wish to recommend a scheme that does not strictly meet the evaluation criteria, then a comprehensive report should be compiled by the jury setting out the evaluation of the proposal and statement / critique for its recommendation.

8.11 Announcement of the winner

The announcement of the winner should be accompanied by a statement / critique of the design by the jury. The announcement should also include a statement /critique of the unsuccessful designs.

8.12 Publicity

The design competition entries and winner need to be publicised in a managed process to attain the following:

- Inform the public via exhibition, the press, TV, internet etc and get their buy-in for the winning design
- Raise the profile of the commissioning or procurement body and the designer
- Help in any political or funding requirements to actually construct the bridge

8.13 Commissioning of the winner to develop the design and/or construct the bridge

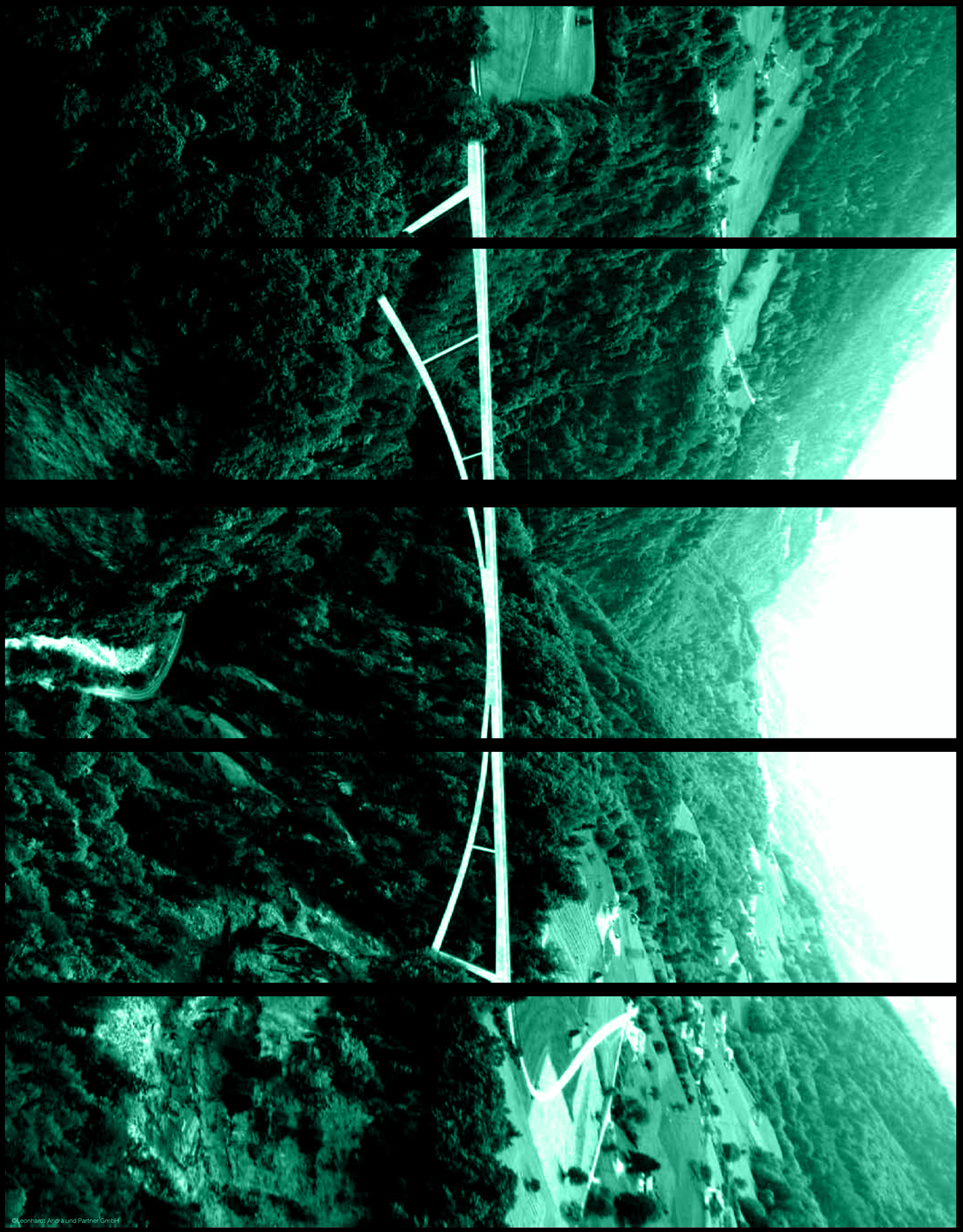
This is the culmination of the Design Competition Stage and commencement of the Implementation Stage. *IABSE*

Glacis Bridge, Ingolstadt, Germany

IABSE

Guidelines for Design Competitions for Bridges

Other issues that need to be addressed



Other issues that need to be addressed

Tamina Canyon Bridge,
St. Gallen, Switzerland

9.1 Who should do the costing

Usually each competitor is required to do their own costing. It is natural that each competitor will endeavour to show that the cost of the bridge is within the client's budget. A mechanism to overcome this is for the client to employ an appropriately experienced bridge consultant or cost consultant to evaluate the cost of all the designs. In this way the cost of the submitted schemes will be evaluated on a similar basis and enable the client to better evaluate the submissions. The client will have more control over the costs if they do the costing themselves, but this may not work when a client has a firm maximum cost. It could be applied where cost is one of the factors in the selection of the winning design.

It is possible that a design may exploit a novel construction method, the benefits of which are not fully recognised by the client's costing consultant or team. The remedy to this is that the competitor should be encouraged to explain his construction method in the submission, and if necessary explain and elaborate during a presentation or interview.

For a design and build competition the contractor's tender price could be taken as sufficient guarantee of out-turn cost if a lump sum fixed price or capped budget is a competition requirement.

9.2 Should the competition be limited to the bridge or a broader context offered

Good designs can sometimes result from visual interplay between the bridge adjacent environs or landscaping, buildings or other features. On the other hand, if the scope of the competition is broadened then there may be problems choosing the winner if one team proposes an exceptional quality bridge and another team makes an exceptional proposal for the other works. In general it is better to focus the competition on the bridge, but it is vital that the bridge design submission includes proposals or at least makes suggestions for landscape and related context in the immediate environs of the bridge. A broader 'visual interplay' design is better procured through a direct commission or a design selected by competitive interview or dialogue. *IABSE*

Stonecutters Bridge,
Hong Kong

Acknowlegement

Cover

Name of Bridge : Stonecutters Bridge
Location : Hong Kong
Type of Bridge : Road, cable stay + orthotropic deck
Client/Owner : Transport Department
Design Competition Winner : Halcrow + Flint & Neill + SMEDI + Dissing & Weitling
Engineer : Arup + Cowi
Principal Contractor : Maeda + Hitachi + Yokogawa + Hsing Chong
Type of Competition : Two Stage Design Competition- First Submission+Shorlisted Submission
Date of Completion : 2010

also shown in chapter 9

Preface

Name of Bridge : Hulme Arch Bridge
Location : Manchester, UK
Type of Bridge : Road, arch + composite deck
Client/Owner : Hulme Regeneration Ltd
Engineer : Arup
Architect : Wilkinson Eyre Architects
Principal Contractor : Henry Boot Construction (UK) Ltd
Type of Competition : Two stage Design Competition - Prequalification + Shortlisted Teams
Date of Completion : 1997

Name of Bridge : Øvre Sund Bridge
Location : Drammen, Norway
Type of Bridge : Girder
Client/Owner : Norwegian Public Roads Administration
Engineer : Multiconsult
Architect : Bovim/Fuglu/Svingen
Principal Contractor : Storm Gundersen
Type of Competition : Invited
Date of Completion : 2011

1

Name of Bridge : Nesciobrug
Location : Amsterdam, The Netherlands
Type of Bridge : Pedestrian + Cyclists, suspension
Client/Owner : City of Amsterdam
Engineer : Arup
Architect : Wilkinson Eyre Architects
Principal Contractor : Van Hattum en Blankevoort + Van Splunder Funderingstechniek + Heerema
Type of Competition : Invited with fee component
Date of Completion : 2003

2

Name of Bridge : Øresund Link
Location : Copenhagen (Denmark) Malmo (Sweden)
Type of Bridge : Road + Rail , girder + cable-stay
Client/Owner : Oresundskonsortiet
Engineer : Arup + SETEC + Gimsing & Madsen + ISC
Architect : Georg Rotne
Principal Contractor : Skanska AB + Hochtief AG + Hojgaard & Schultz A/S + Monberg & Thorsen A/S
Type of Competition : Two Stage Design Competition Prequalification + Shortlisted Teams
Date of Completion : 2000

3

Name of Bridge : Gateshead Millennium Bridge
Location : Newcastle, UK
Type of Bridge : Pedestrian/Cyclist, arch
Client/Owner : Gateshead Borough Council
Engineer : Gifford UK
Architect : Wilkinson Eyre Architects, UK
Principal Contractor : Volker Stevin/Harbour and General
Type of Competition : Two Stage Design Competition; Open/ Shortlisted
Date of Completion : 2001

Name of Bridge : Ting Kau Bridge
Location : Hong Kong
Type of Bridge : Road, cable-stayed
Client/Owner : Highways Department Hong Kong
Engineer : Schlaich Bergermann und Partner
Principal Contractor : Ting Kau Contractors Joint Venture: Cubiertas y Mzov S.A. Madrid; Downer and Co., Hong Kong; Entrecanales y Tavora S.A., Madrid; Paul Y Construction Co., Hong Kong; Ed. Züblin AG, Stuttgart; Freyssinet, Vélizy
Type of Competition : Design & Build including design quality evaluation
Date of Completion : 1998

4

Name of Bridge : London Millennium Footbridge
Location : London, UK
Type of Bridge : Pedestrian, suspension
Client/Owner : Southwark Borough Council London
Engineer : Arup
Architect : Foster + Partners
Principal Contractor : Monberg & Thorsen / Sir Robert McAlpine JV
Type of Competition : Open (221 entries)
Date of Completion : 2000

5

Name of Bridge : Jiubao Bridge
Location : Hangzhou, China
Type of Bridge : Road, arch
Client/Owner : Hangzhou Urban Construction Investment Group Co. Ltd
Hangzhou Urban Infrastructure Construction and Development Corporation
Engineer : Shanghai Municipal Engineering Design Institute Co. Ltd
Principal Contractor : Second Harbour Engineering Company Ltd of China Communications Conctruction Corporation (CCCC) Road & Bridge International Co. Ltd
Type of Competition : multi-phase competition for selecting a design solution and a design team
Date of Completion : 2011

Name of Bridge : Lockmeadow Bridge
Location : Maidstone, UK
Type of Bridge : Pedestrian cable stay, aluminium deck
Client/Owner : Maidstone Borough Council
Engineer : Flint & Neill Ltd
Architect : Wilkinson Eyre Architects UK
Principal Contractor : Christiani & Nielsen
Type of Competition : Invited
Date of Completion : 1999

Name of Bridge : Tradeston Footbridge
Location : Glasgow, UK
Type of Bridge : Pedestrian + Cyclists, Steel footbridge, 'arrow head' fin back deck
Client/Owner : Glasgow City Council
Engineer : Halcrow Group Ltd
Architect : Dissing + Weitling Architects
Principal Contractor : BAM Nuttall
Type of Competition : Design & Build including design quality evaluation
Date of Completion : 2009

6

Name of Bridge : Tri-Countries Bridge
Location : Germany
Type of Bridge : Pedestrian - arch
Client/Owner : City of Weil am Rhein
Engineer : Leonhardt Andrä und Partner GmbH
Architect : Feichtinger Architects
Principal Contractor : Max Bögl GmbH & Co. KG
Type of Competition : Limited/ by invitation
Date of Completion : 2007

7

Name of Bridge : Compiègne Bridge
Location : Compiègne, France
Type of Bridge : Road, arch and underslung catenary
Client/Owner : Agglomération de la Région de Compiègne
Engineer : Flint & Neill Ltd
Architect : Explorations Architecture
Principal Contractor : Demathieu et Bard
Type of Competition : International Design Competition
Date of Completion : 2011

Name of Bridge : Danube Bridge
Location : Linz, Austria
Type of Bridge : Road, suspension
Client/Owner : Amt der Oberösterreichischen Landesregierung
Engineer : Schlaich Bergermann und Partner
Architect : gmp · Architekten von Gerkan, Marg und Partner
Principal Contractor : tbd
Type of Competition : Invited Competition with Prequalification
Date of Completion : 2014 (envisaged)

Name of Bridge : Dongman Bridge
Location : Shenyang, China
Type of Bridge : Road, arch
Client/Owner : Shenyang Urban Construction Project Office Transportation Bureau of Donling District of Shengyang
Engineer and architect : The Architectural Design and Research Institute Co. Ltd of Tongji University
Principal Contractor : Shenyang Municipal Group Co. Ltd
Type of Competition : The ideas competition
Date of Completion : 2013 (envisaged)

Name of Bridge : Forth Replacement Crossing
Location : Edinburgh, Scotland
Type of Bridge : Road, cable-stay
Client/Owner : Transport Scotland
Engineer : Arup
Architect : Dissing + Weitling
Principal Contractor : FCBC
Type of Competition : Selecting a design team: The competetive dialogue
Date of Completion : 2016

8

Name of Bridge : Glacis Bridge
Location : Ingolstadt, Germany
Type of Bridge : Road, cable-supported concrete deck
Client/Owner : Stadt Ingolstadt
Engineer : Schlaich Bergermann und Partner
Architect : Schlaich Bergermann und Partner; Ackermann und Partner, München; Peter Kluska, Landschaftsarchitekten, München
Principal Contractor : ERA Bau AG, NL Salzburg; PREUSSAG Spezialtiefbau GmbH, NL Augsburg; Pfeifer Seil-und Hebetechnik GmbH, Memmingen
Type of Competition : Invited
Date of Completion : 1998

Name of Bridge : Mulde River at Pouch
Location : Germany
Type of Bridge : Road - girder
Client/Owner : Landesbetrieb Bau Sachsen-Anhalt , Niederlassung Ost
Engineer : Leonhardt Andrä und Partner GmbH + Hyder Consulting GmbH Deutschland
Architect : JSK Dipl.-Ing. Architekten
Environmental expert : Plan T Planungsgruppe Landschaft, Umwelt
Principal Contractor : tba
Type of Competition : Limited (shortlisted after prequalification phase)
Date of Completion : 2015 (envisaged)

Name of Bridge : Yi Sun-sin Bridge
Location : Gwang-yang, Jeollanam-do, Korea
Type of Bridge : Road, suspension
Client/Owner : Jeollanam-do Province
Engineer : Yooshin Corporation
Principal Contractor : Daelim Industrial Co. Ltd
Type of Competition : Open Competition(Basic design turn-key) - Selecting a Design and Build Contractor
Date of Completion : 2012

9

Name of Bridge : Tamina Canyon Bridge
Location : St. Gallen, Switzerland
Type of Bridge : Road - arch
Client/Owner : Canton St. Gallen
Engineer : Leonhardt Andrä und Partner GmbH
Principal Contractor : tba
Type of Competition : Open
Date of Completion : 2016 (envisaged)

Publisher:
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