BUILDING DESIGN KNOWLEDGE through MATERIALS RESEARCH: International student design competition entries for a Wood Research and Educational Facility

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One of the most common criticisms of academia in the training of architecture students is the lack of practical, case–based experience which would prepare them for the "real world" of architecture. Of course, we must here acknowledge the *de facto* separation of idea and realisation not just for students, but also for practitioners (who after all produce *drawings* to be *realised* by others). Nevertheless, such critiques often also suggest a definition of the "real world" of architecture as a place where projects achieve a high degree of (formal and technical) resolution. Many commentators would go on to identify other issues - such as clarity of communication, adherence to time and cost factors, real client input and civic values - as valid *real-world* concerns. Another frequent suggestion is that case-based projects allow students to be introduced to the process of *design-in-practice.* Much of this goes against the grain of recent academic trends – within our own school and elsewhere – that isolate "conceptual" concerns as the essence of architectural design. (1).

At the same time, influential voices within the profession have – partly in response to internationally well-publicised examples – increasingly promoted the idea that architectural design competitions promote and produce "good architecture". While there is little hard evidence in support of this (by no means unanimous) view, the image of competitions as midwives of enlightened and innovative architecture remains embedded in the imagination of many in the profession. (2)

In an attempt to define a framework for a more constructive dialogue between architectural education and practice in the United States, the work of Ernst Boyer and Lee Mitgang (3) also seems pertinent to wider international concerns about the objectives of architectural education. More particularly, those pertaining to the relationships between notions of architecture as intellectual *discipline*, (theoretical, scientific, artistic, philosophical, or otherwise), as professional *practice,* or as *representative* of wider socio-cultural values.

The standards used to evaluate student work and programme performance should be organised not so much around blocks of knowledge as around modes of thinking: the discovery, application, integration and sharing of knowledge. (4)

In the university-based schools, much of this discourse has traditionally revolved around myriad strategies for "integrating" various scientific, technical and sociological topics into the design process. However, experience has shown that simply introducing more information and/or knowledge into the design process does not, in itself, ensure "integration, application or sharing of knowledge". Nor does it necessarily ensure "good architecture". In beginning to consider ideas and methodologies that might address the concerns identified by both Boyer and Mitgang and the Profession, we also sought to orientate our studios beyond the immediate theoretical preoccupations and evaluation standards of our own school.

Thus, we began to consider the potential of internationally-prestigious design competitions to offer some other, distinctly architectural, measure of performance – a "bench mark", if you will, for "good architecture". One of our underlying propositions is that the same level of creativity, intellectual rigour and commitment must be applied to the development, resolution and detailing of an architectural idea as to its conception. Thus, the requirements of the competition project must be at once simple enough for students to reach the design development stage, yet complex enough to require the interrogation of a range of potential techniques for realisation. Projects based on building type can similarly facilitate a more structured exploration of relationships between programme, form, material and technique.

A preliminary review of competitions aimed at the profession identified a distinction between *project* competitions - where there is an intention and commitment to build - and *ideas* competitions, designed to stimulate discussion. A similar review of student competitions also indicated two, broadly analogous, groups:

The *programmatic,* competition. These usually identify and/or prescribe specific programmes, criteria, materials and even types of drawings within the competition briefs. These are frequently sponsored by manufacturers or other industry associations seeking to encourage innovation in the use of specific materials or techniques. These programmes can provide a framework within which to guide students through the particular phases of the design process. The rigidity or looseness of the framework will depend on circumstance but, in our shared experience, comprises an important part of design teaching.

The *conceptual* competition**.** More abstract, thematic or idea-based competitions. Typically, there are few or no restrictions on the scope, context, type, programme, media or format of the submitted works. Each participant is

expected to articulate his or her own philosophical position relative to a notional theme. These competitions – effectively predicated on a presumption that students have already acquired sophisticated conceptual and presentation skills - are arguably more appropriate for experienced upper-school students or young professionals.

After consideration of a number of possibilities, we identified several student competitions reflecting the teaching and research interests of the authors (construction, materials, detailing, thermal environment and designing with light) and/or those which have emphasised particular material, technical or environmental themes as principal criteria for overall design excellence. Although we reviewed competitions predicated on an exploration of a particular material or technology, we aim to establish a process in which materials, construction systems and environmental strategies – while important in themselves – nevertheless remain the means by which to achieve conceptual design objectives. Thus, while our studios have been concerned with what some may refer to as integration – they have also emphasised this requirement for architectural excellence. Our objectives were thus;

-to consider whether international competitions can make a contribution to design studio methodology and evaluation.

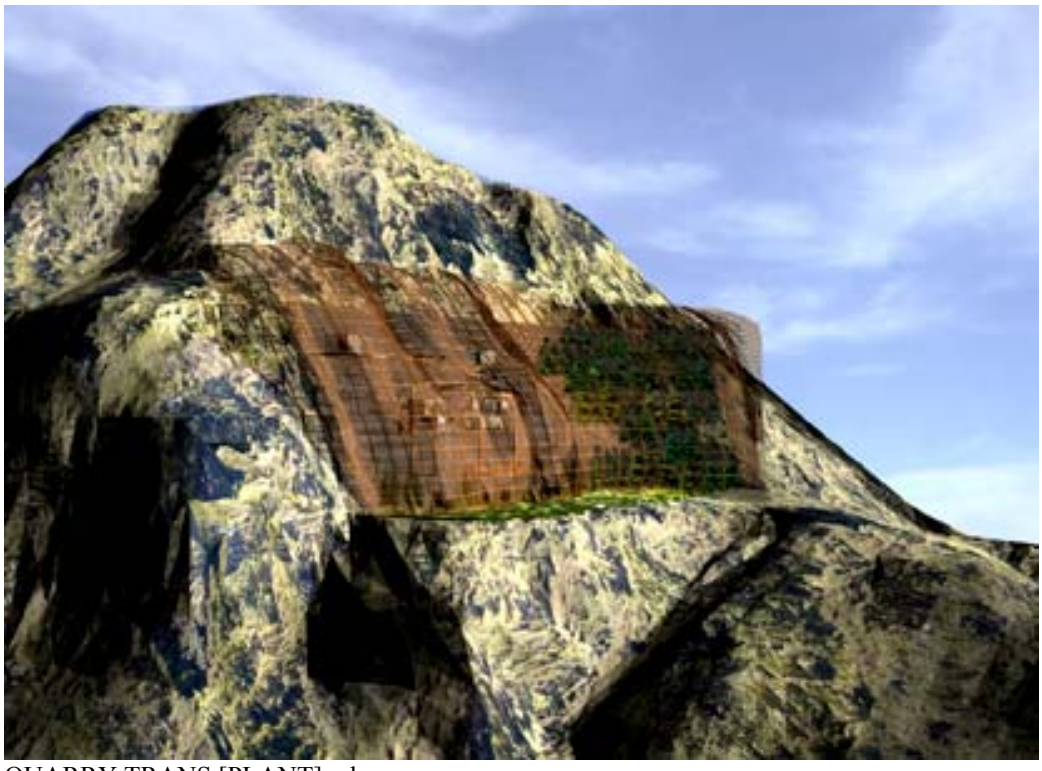
-to explore whether competition-based projects can serve to stimulate imaginative connections between broad conceptual ideas and the methods by which these might be applied or realised;

-to encourage discussion of the relationships between form, material, technique, environmental issues and representation;

-to encourage the sharing of knowledge through team work and student-centred peer-review;

-to investigate how the success or otherwise of our efforts might be measured or evaluated;

The 2001ACSA/Wood Products Council International Student Design Competition for a Wood Research and Educational Centre (or similar facility) provided the framework within which we could explore these objectives. Wood was identified as particularly pertinent to our investigation since it is at the same time the most common, the most archaic and yet the most sophisticated of materials. Structurally, conceptually and aesthetically it has been assimilated into a huge range of formal experiments, technical innovations, production techniques and labour practices. It has been central to the development of Architecture in New Zealand and remains all the more important in the light of current concerns for environmental sustainability. Yet still, its material particularity remains under-theorised, its technical potential bound by unquestioned assumptions formalised as Building Codes, and its formal application largely confined to normative practices. Current marketing orthodoxy in New Zealand has made it more profitable to cut and export raw logs than to develop new ideas and products.

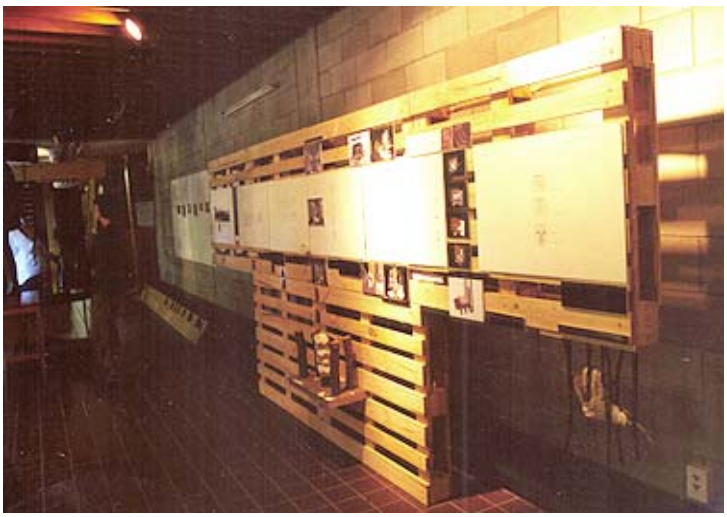


QUARRY TRANS [PLANT]-ed
Award winning competition entry designed by: Richard Wang, Stephen Wang and Philip Kwong

This studio challenged students to articulate, extend and speculate on the theoretical, phenomenological, technical and aesthetic potential of wood (including e.g. engineered wood, green wood, composites, laminates, cardboard, paper, bamboo, interiors, fabrication, detail, etc) in developing beautiful architecture.

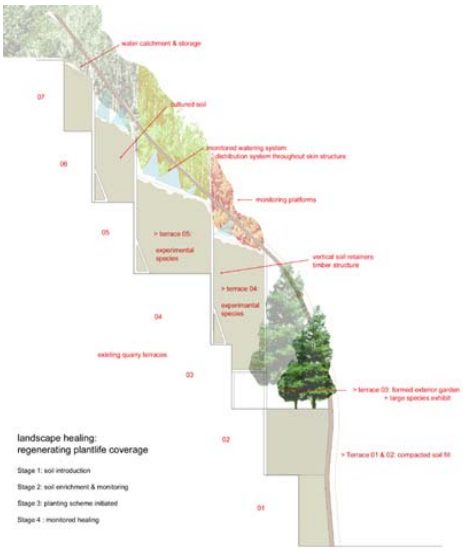
The competition brief required that wood be used as the primary structural material, with special emphasis placed on resource efficiency in both construction and everyday use (including environmental control systems and response to climate). The studio emphasised material innovation and recognised the growing availability of recycled wood and engineered wood products. Another major goal of the studio was to make students aware that background research is a fundamental element in approaching any design project. This is particularly true within the context of ongoing development in materials, technology and information systems. Students were also encouraged to consider methodologies for collecting, recording and disseminating data on site, climate, materials performance and detailing. Students could choose to work individually or to collaborate in teams. The minimum requirements for the competition entries were: building plans; site and building sections; exterior perspectives, axonometric or model photographs of the project; one interior perspective illustrating the character of the principal space(s) and materials; two large-scale, detail drawings: one illustrating the architectural/structural use of wood in the design solution, and one that describes a furnishing, fixture or similar detail (suggested scale was 1:10); and a brief essay (appearing as part of the presentation boards) describing the most important concepts regarding the use of wood in the design project. Students were also allowed to include any other information that would help to communicate the nature of their solutions. While electronic media-based proposals were encouraged, submissions had to be printed out on no more than four 500X700mm panels to conform to competition guidelines. Due to the Northern Hemisphere academic timetable and submission requirements for the competition, the design project had to be completed in 7 weeks. The rest of the semester was spent developing certain aspects of the projects in more detail and - just as importantly -in preparing a public exhibition of our work.

PUBLIC EXHIBITION OF ACSA - WOOD INTERNATIONAL STUDENTS DESIGN COMPETITION DESIGN PROJECTS, AT THE AUCKLAND SCHOOL OF ARCHITECTURE IN JUNE-JULY 2001



Five projects were submitted from the University of Auckland School of Architecture. All the projects illustrated came from a studio run by the authors, who also recently presented a joint paper to the ACSA International Architectural Education Conference in Istanbul, on the potential of student competitions to act as benchmarks of a school's design quality. (5)

The design by Richard Wang, Stephen Wang and Philip Kwong to re-utilise and repair an abandoned quarry in the Waitakeres took Second Prize from over 500 entries from 50 schools worldwide.



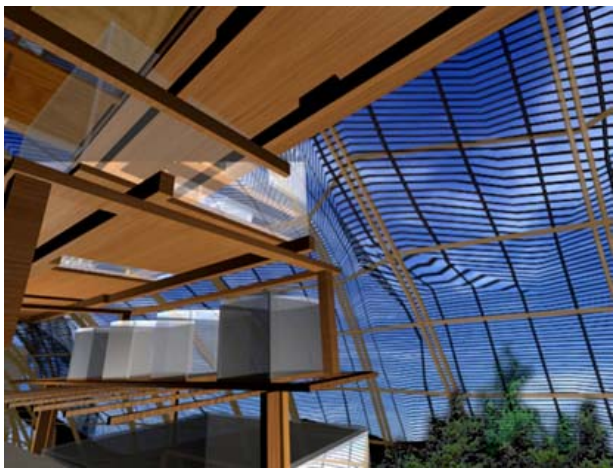
THE HEALING SCHEME
SECTION THROUGH THE QUARRY

EXPERIMENTAL PLANTING PATHWAY

The project exploits the potential of modern engineered wood products to contribute to sustainable architectural practices. A new environmentally-responsive skin serves to repair the scars of earlier quarrying operations and creates a dynamic spatial enclosure for the research centre facilities supported on the existing quarry terraces.

THE SKIN

THE STRUCTURE OF THE SKIN

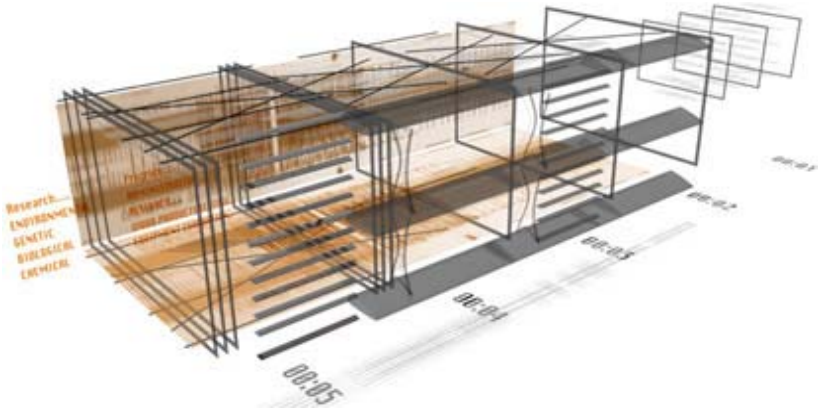


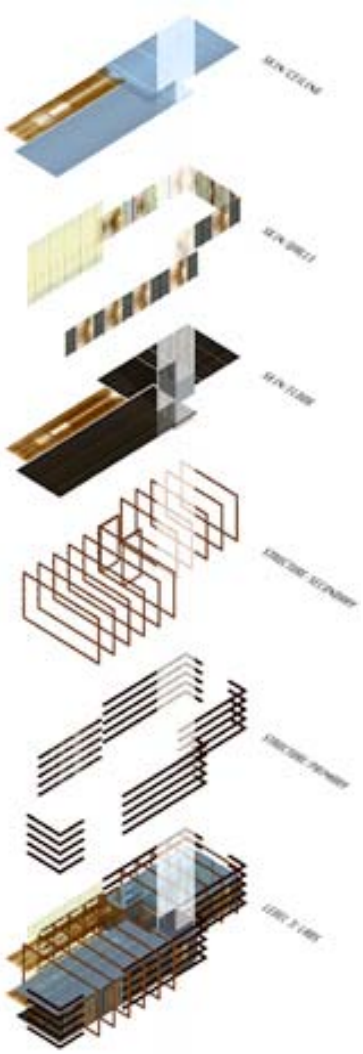
INTERIOR OF THE RESEARCH LAB INTERIOR OF THE RESTAURANT

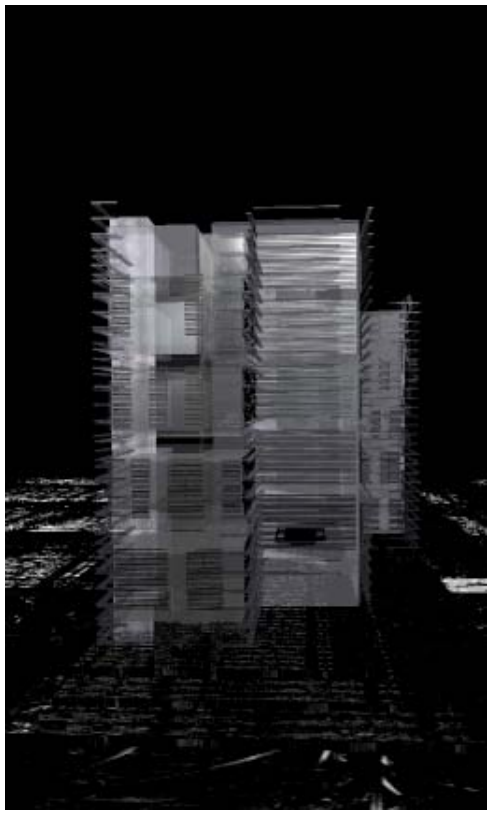
The project by David Klosser and Andrew Smith, which received an Honourable Mention, addresses similar environmental concerns. Their Indigenous Species Research Centre proposes using layers of timber frames to create contextual, environmental and atmospheric conditions of varying intensity and detail.

LAYERS OF THE ENVELOPE

ENGINEERED WOOD STRUCTURE

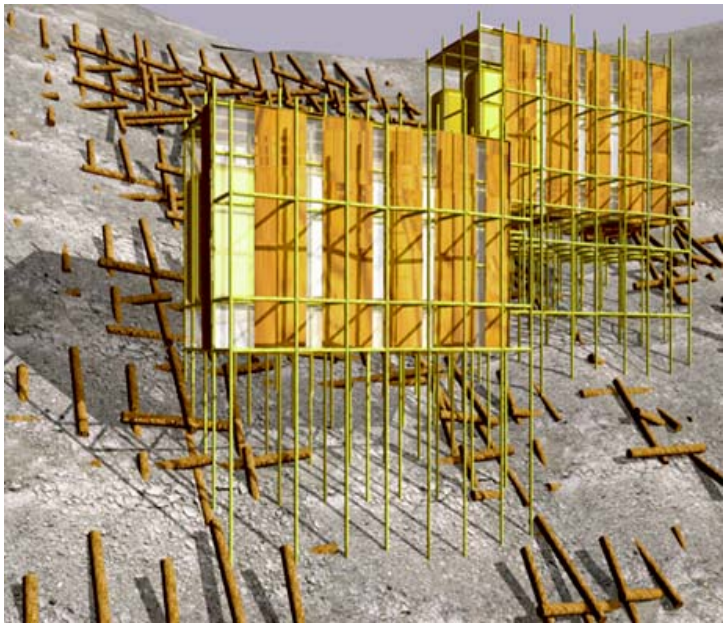


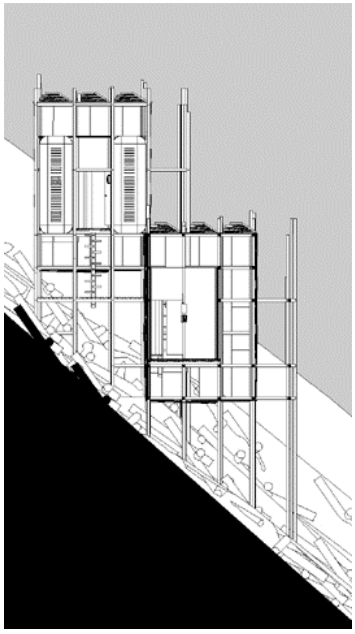




ELEVATION ENTERIOR STRUCTURE

The project by Stirling Burrows, Jonathan Gibb and Michael Hartley also seeks to repair the environmental damage of earlier times. Here a lightweight research facility is placed precariously on the Tarndale Slip, near Gisborne. A pole structure, with plug-in service units, sits on a timber *grillage* placed over the existing ground - a reminder of the fragility of the de-forested landscape.

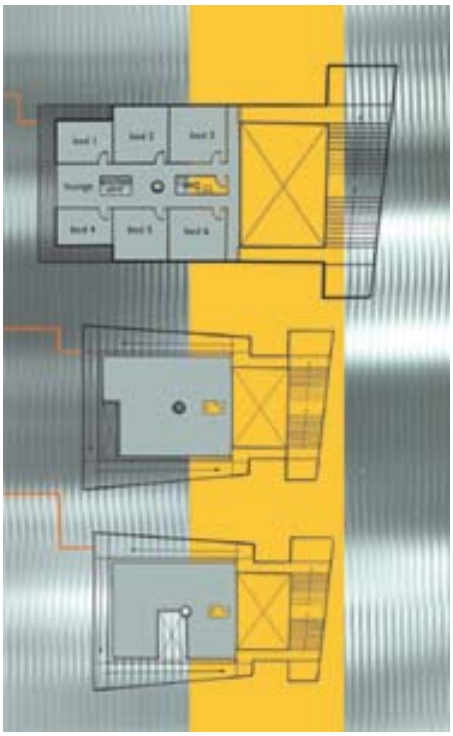


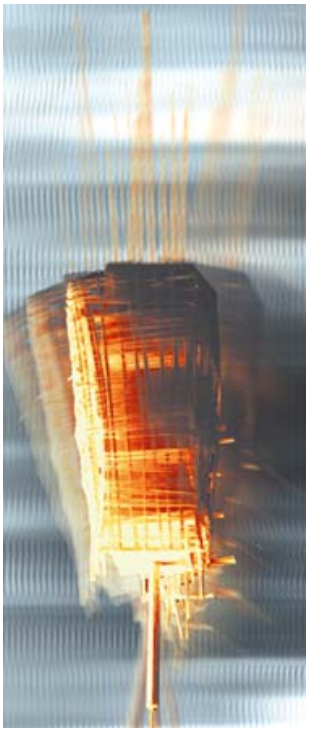


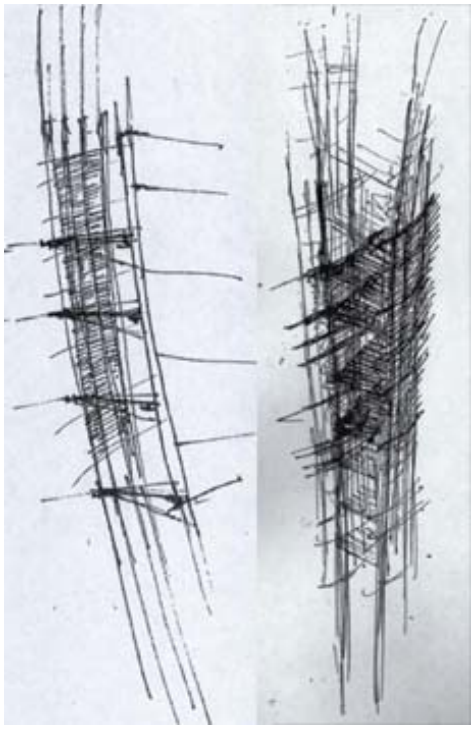
COMPUTER MODEL - WOOD RESEARCH CENTER ON THE TARNDALE SLIP SECTION

Sophie Hermann's design for a seismic research facility on Rangitoto Island also acknowledges the precarious, fragile nature of settlement in New Zealand. An elegant, beautifully crafted timber tower changes its appearance in response to climatic conditions.

SEISMIC RESEARCH FACILITY ON RANGITOTO ISLAND -







FLOOR PLAN MODEL SKIN STRUCTURE

Notes:

1. Heylighen, A. & Neuckermans, H. Walking on a thin line – between passive knowledge and active knowing of components and concepts in architectural design, *Design Studies* 20 (1999): 211-235.
2. Dillon, D. "Playing the competitions game," *Architectural Record*. v.185, (Nov.1997): 62-7; Strong, J. *Winning by Design*. (Oxford, UK. Butterworth Architecture, 1996).
3. Ernst L. Boyer and Mitgang, L. *Building Community: A New Future for Architectural Education and Practice*. (Princeton, NJ: Carnegie Foundation, 1996)
4. *Ibid.,* p65-66.
5. Walker, C. and Hrisafovic, S. *Weighing up the Competition; International Student Design Competitions as Benchmarks of Quality*, in Proceedings of ACSA Annual Conference; *Geography, Identity, Space*; Istanbul, Turkey. June 15-19/2001.

Evenstad bridge

Stor-Elvdal, Norway