



NEWSLETTER - MARCH 2009



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1. NIMT PLAQUES UNVEILED

NOTES BY ROB ASPDEN – FEB 2009

The weekend of 14th and 15th February 2009 was marked for the unveiling of the last two of four IPENZ heritage plaques to be awarded to mark the centenary of the North Island main Trunk railway – the most important section of rail line in the country and truly an amazing feat of engineering.

In the event the weekend turned out to be a superb engineering heritage weekend for Rob Merrifield and myself, for it allowed us to not only see that the plaques (for Makatote Viaduct and the Raurimu Spiral) were unveiled in due manner, but also

- to part participate in the opening of the DOC's Ohakune Old Coach Road walkway,
- to walk under the new Hapuawhenua Viaduct and across the now accessible old viaduct,
- to visit the site of the Tangiwai rail disaster,
- to consider the condition of four of the existing IPENZ heritage plaques,
- to view the South Rangitikei rail viaduct (an example of modern heritage), and
- to discover an old hydro power station.

1.1.1 Old Mangaweka Power Station



We were blessed with lovely weather the whole weekend and travelled north on Friday 13th. It was lucky Friday for us because we turned off SH 1 at Mangaweka to find a place where we could view the usually hidden South Rangitikei rail viaduct. We found the view of the viaduct that we wanted, and also found the old Mangaweka power

station right at the same point.

The disused power station (25 kW) was built in 1913 to provide power for the town water supply pumps. Sadly a large log stuck in the intake closed the station in 1936, but we enjoyed the short walk up to the still existing dam.

1.1.2 South Rangitikei Rail Viaduct

Back at the view point we reflected on the innovative earthquake design of the tall piers and the aesthetically pleasing clean form of the structure.



Equally thought provoking was the memorial and site of the 1953 rail disaster at Tangiwai on the bank of the Wangaehu River. Also the evidence of the power of the recent lahar which swept down from Mt Ruapehu, the lahar itself controlled by preparatory earthworks on the lower slopes of the mountain.

On Saturday there was an unfortunate clash between our unveiling ceremony at Taumarunui and the opening of the DOC Ohakune Old Coach Road walkway.

1.1.3 Special Excursion Train pulled by a WAB loco from Feilding Steam

Sadly we couldn't attend both, but by the generosity of Paul Mahoney (one of the Wellington Chapter members, also one of the main people responsible for the new walkway) I was able to ride on the special excursion train pulled by a WAB loco from Feilding Steam. I was able to travel from Ohakune to Horopito where I rejoined Rob for the journey to Taumarunui.



1.1.4 “Taumarunui on the Main Trunk Line”

At Taumarunui we were joined by John La Roche and Alec Aitken who had come down especially from Auckland for the event. The unveiling, organised by the Ruapehu District Council took place on the platform of the station. This was timed to occur when another excursion train making a two day journey from Auckland to Wellington as the final celebration of the NIMT centenary. The train passengers and our small group were welcomed by a group of locals with the song “Taumarunui on the Main Trunk Line” (of course!).



Then it was our turn to make the unveiling and to talk about IPENZ heritage activities and the two heritage items being recognised, Makatote Viaduct and Raurimu Spiral. The photo here shows Rob giving details about both items to the gathering.

1.1.5 the new Ohakune walkway

Next morning we resolved to visit the new Ohakune walkway. DOC and their workers have done a splendid job clearing the Old Coach Road and then making a new track from the nearest point on it to pass under the new Hapuawhenua viaduct and lead on to newly re-decked old viaduct. We were there in time to see the excursion train cross the new viaduct and meet up again with some of the passengers as they joined us to walk across.



Then it was back to Wellington.

The previous day and the return journey allowed us to check on four existing IPENZ heritage plaques, and their condition provided some lessons for us.

There are two on the Last Spike monument (one being the 1990 plaque and the second one jointly awarded with the American Society of Civil Engineers). Both of these are in pristine condition, mainly due, I imagine, to the recent centenary celebrations there.

1.1.6 Hapuawhenua Viaduct 1990 plaque

While at Hapuawhenua we also saw the 1990 plaque awarded to the new viaduct. Despite being remote it has suffered some vandalism. In addition it is inaccessible to the public.



It should be moved and this needs to be arranged. The fourth plaque is the 1990 one on the Mangaweka – Utiku deviation, SH 1. It is not in good condition but damage may be due to electrolytic action between the bronze plaque and the holding pins. In addition it is located in a special lookout area beside the new road.

What should be a magnificent view is becoming obscured by plant growth, and in winter becomes a marsh, preventing dry access to either the plaque or the view. Maintenance of plaques and information boards is a question for the Engineering heritage Board to consider.

We were well satisfied with the chance to see examples of this country's engineering heritage and proud to feel part of what has been achieved.

1.1.7 Two More North Island Main Trunk Railway Plaques Unveiled



14 February, 2009, was the centenary of the handover from the Public Works Department to the Railways Department of the last portion of the North Island Main Trunk Railway and the institution of the permanent timetabled train services. Two more IPENZ heritage plaques were unveiled at Taumarunui railway station by Rob Aspden, Chairman of the Wellington Chapter, Engineering Heritage Board.

A special tour train that travelled from Auckland to Wellington stopped at Taumarunui for official greetings from the local community.

As a part of this reception, Rob spoke to the gathered crowd of IPENZ and its engineering heritage work.

He then unveiled two plaques that will be placed adjacent to and to mark the significance of Makatote Viaduct and of the Raurimu Spiral.

IPENZ was also represented by Rob Merrifield, John La Roche and Alec Aitken, (these last two of Auckland).

Rob Merrifield followed Rob Aspden, to speak of the effort by many people that made these distinctive features of the railway possible. He commented on how the surveyors and builders faced enormous difficulties, working under very isolated and primitive conditions yet applying the very best and most modern technology of the day as appropriate. "It was still the era of the pick and shovel for most earthworks," he said, "Many of the workforce were fresh migrants from England, totally unprepared for the conditions they had to live and work in."

The Raurimu Spiral, or some equivalent, was almost inevitable as soon as the decision to route the railway west of the three volcanoes instead of up the Waikato River and over the route of the Desert Road as originally proposed was taken in 1884, he said.

The possible route set a problem to the location engineers. From Kakahi on the Wanganui River to National Park is some 26 km direct distance. In this distance the railway has to rise 550 metres, an average gradient of 1 in 47. This rise culminated in a climb of 213 metres in the last 6.4 km, an average gradient of 1 in 30. Worse, at Raurimu, a rise of 132 metres occurs in only 2 km. That is an average gradient of 1 in 15, far too steep for a conventional railway, so a better solution would have been wanted.

The search for a viable descent from National Park began in 1887, when 8 survey

parties set out to try and find one. They did not succeed.

R W Holmes worked from 1892 to 1898 to find a practicable gradient on the route we know as the Spiral. He made good use of the lie of the land, with sweeping curves and a full circle that alone lost more than 22 metres in altitude. It was an elegant solution that belies the many hours of hard work in thick bush and draughting tent that went into the finding of it.

Locating, building, and operating the Raurimu Spiral has been a major application of engineering excellence over a long period.

The need for Makatote Viaduct was foreseen from the time exploring surveyor John Rochfort pegged his original line in 1884. Located some 350 km north of Wellington, it was the last and highest of 9 major metal viaducts. Peter Hay, who designed all the big viaducts from Makohine to Makatote for the PWD, has left an impressive legacy for us. Makatote is a classic example of the trestle type viaduct first developed in North America, in which a series of towers support intervening spans. Essentially simple in principle, they are very “buildable” and have served us well. It is 78 metres high and 262 metres long. Some 975 tons of steel were used in building it, along with 1200 tons of cement for the concrete.

J & A Anderson Ltd of Christchurch built a workshop of 800 square metres across the railway from the present State highway at the north bank of the Makatote stream. It was equipped with the best and most modern equipment of the day. A water turbine powered the stone crusher and concrete mixer. Steam drove the machine tools, electricity generator (for lighting), and the cableway across the centreline of where the viaduct was to be built.

When partner Andrew Anderson moved to the site, his wife Laura set methodically about establishing her medical kit and adding to her expertise, against emergencies and first aid needs. Seven men were killed during the building of Makatote, so there certainly would have been plenty of lesser injuries.

On a more positive note, the Anderson family went to a lot of trouble to provide entertainment for workforce and visitors while living beside their workshop. Sing-song evenings were frequent, up to full musical concerts. Despite their isolation in the midst of the Waimarino forests, the Anderson’s home was firmly included in the high society of the day. Newspapers in the big cities included notes of their visitors and events in the social columns.

It is difficult to draw a viable comparison for their achievement in the present day.

Perhaps we have to look to Australia for parallels, in the establishment of new mines and supporting towns in their Outback.

Despite the difficult access, isolation and adverse weather, with plenty of rain and snow, from the letting of the contract on 15 June 1905, Andersons started actually building Makatote on 25 June 1906. They placed the last truss girder on 4 June 1908; and they declared the viaduct complete on 10 July 1908. Two years work, applying the best standards of engineering, went into the construction of the viaduct we see and use a century later. Before that, the PWD engineers under Peter Hay were also working at the forefront of their profession.

Rob concluded by saying, “As a latter-day civil engineer, I have long had great respect for the expertise and achievements of our forebears who did so much to make our present-day New Zealand possible. I salute them, and ask that you do so too.”

Rob Merrifield

2. BOOK REVIEWS

2.1 “AN ENERGETIC LIFE” BY SIR COLIN MAIDEN



Sir Colin Maiden's autobiography is a story about his working life as an engineer, full of exceptional achievements. The title "An Energetic Life" is a gross understatement of Colin's considerable effort, leadership and success, not only at New Zealand's leading University, but also his involvement in the energy sector and a large number of NZ companies.

His book is a fascinating read describing his own involvement and that of many other leading engineers and scientists who have made very significant contributions to the progress of New Zealand. It is a book of great importance, an excellent record full of detail and personal insights.

Colin was born in 1933 in Auckland, attending Epsom schools and Auckland Grammar.

His early school years were dogged by ill health from chest infections and a burst appendix, but in spite of this, he played rugby at Grammar first fifteen and won the senior doubles school tennis prize in the 6th form. Moving to Auckland University School of Engineering at Ardmore in 1952, he records his appreciation of Alan Titchener, Cecil Segedin, Neil Mowbray, Bevis de Bray and Gordon Bogle, some of the very talented lecturers who were responsible for training so many of us who studied at Ardmore.

Having done well academically and been fully involved in the sporting and student life of the University, Colin was encouraged by Professors Dalton and Bogle to apply for a Rhodes scholarship which he was awarded in 1955. Prior to leaving for Oxford, he completed his thesis "Boundary Layer Flows at High Temperatures" for the first ME degree to be awarded by Auckland University. At Oxford his thesis for DPhil was "The effect of Temperature on the Static and Dynamic Strength Properties of Materials", completed in 1957 after being awarded an Oxford University tennis blue.

Colin's first appointment was to the Canadian Armament Research and Development Establishment in Quebec researching the flight of high velocity projectiles into space. By 1960 he was keen to return to NZ and accepted a senior lectureship in mechanical engineering at Ardmore School of Engineering. But his skills in Canada had been

recognised by General Motors who were starting a new defence division. They offered him a job at a salary many times what he was earning at Auckland University. After a year lecturing at Ardmore with support from Alan Titchener and Gordon Bogle, he accepted the General Motors offer and moved to Santa Barbara working on hypervelocity flight and impact in the early space initiatives with NASA. In 1966 he moved to head the metal forming and die department at GM in Detroit. But by 1969, again feeling the need to return to NZ, he expressed interest in the position of General Manager at New Zealand Steel. After Sir John Ingram was appointed to this position, he was persuaded to apply for the Vice Chancellor's position at Auckland University.

Colin Maiden was the youngest Vice Chancellor in the Commonwealth when he took up the position in 1971. When he retired 24 years later, he had served longer than any other Commonwealth Vice Chancellor. During his term as Vice Chancellor there were huge changes in tertiary education and governance at the University of Auckland. The central city site for the University had been confirmed, but Colin was very concerned about the poor facilities for students with no recreational facilities and very few welfare services. Colin was able to institute many new student facilities, including the Maidment Theatre, the Marae and the Tamaki sports fields, now called Colin Maiden Park. Fascinating insights into the workings of the University Senate and Council are described along with the dexterity needed to find ways through the many demands. Colin was passionate about improving the standing of the University by the appointment of top academic staff through all faculties. He can certainly take much credit for the high world ranking the University of Auckland now enjoys.

With a request from the Prime Minister, Norman Kirk and University Council approval in 1973, Colin was asked to lead the NZ input into the NZ/US Joint Agreement for Science and Technological Co-operation. The oil shocks of that year led to the formation of the NZ Energy Research and Development Committee which included Ray Meyer and David Thom. Dr Garth Harris was soon appointed as Executive Officer. Later, Alan Titchener, Mary Earl, Miles Kennedy and Basil Walker served on the Committee. George Gair, Minister of Energy in 1978, invited Colin to chair the Liquid Fuels Trust Board with the mandate to "cooperate in any activity to investigate ways of substituting imported oil with indigenous energy resources". Basil Walker was the first Technical Director followed in 1980 by Alan Titchener and David Natusch in 1981. The Trust Board's recommendation to produce synthetic fuels from Maui gas, led to Colin's appointment as Chairman of the Board of NZ Synthetic Fuels Corporation.

With his energy expertise, Colin was appointed as a director of the NZ Refining Company and just before his retirement as Vice Chancellor, as a director of Transpower. Other directorships and chairmanships followed and Colin gives most interesting insights into the operations and difficulties faced by a wide variety of companies, including Mason Industries, Fisher and Paykel, Farmers Trading Co, Progressive Enterprises, Foodland Associated Ltd, Fisher and Paykel Healthcare, New Zealand Steel, Winstone Ltd, Wilkins and Davies, National Insurance, ANZ Banking Group, Tower Corporation, Sedwick NZ, Independent Newspapers, and DB Breweries.

I can thoroughly recommend this book to all professional engineers and others who wish to be inspired by an incredible story of success though high academic achievement, involvement in a wide variety of industries, and very hard work.

"an Energetic Life", 284 pages long, is published in paperback by Dunmore Publishing, PO Box 25 080, Wellington 6146. The cost is \$34.95

John La Roche, February 2009

In July 2008 the Department of Conservation published two handbooks on the maintenance of historic structures. These are available as free downloads from the DoC website <http://www.doc.govt.nz>

2.2 CONSERVATION OF IRON AND STEELWORK IN HISTORIC STRUCTURES AND MACHINERY

By W L Mandeno

2008 no. 247

Pages: 33

Abstract:

This handbook has been prepared to provide guidance on the basic principles and techniques involved in the preservation of historic iron and steelwork standing outdoors in New Zealand. The suitability of different processes and coating materials for the protection of heritage structures and machinery are discussed. Marine structures, shipwrecks and artefacts in museum storage are not specifically included.

Full text: <http://www.doc.govt.nz/upload/documents/science-and-technical/sap247entire.pdf>

2.3 HISTORIC CONCRETE STRUCTURES IN NEW ZEALAND: OVERVIEW, MAINTENANCE AND MANAGEMENT

By P Reed; K Schoonees; J Salmond

2008 no. 248

Pages: 90

Abstract:

Early concrete structures form an important part of New Zealanders' cultural heritage. This handbook describes the historical development of concrete and its properties, and outlines the background to early concrete structures, concentrating on the early use of concrete (up to the 1940s) as a building material in New Zealand. It identifies characteristic defects and patterns of deterioration in the material, and explains how these may be recognised and described. Concrete is a complex and varied material, and its production has become more sophisticated over time; thus, its manufacture, properties and uses were influenced by the knowledge and perceptions at the time of construction. Repair methods have also changed considerably in the last few decades and are still changing. As the components of concrete have been undergoing continuous development over the past 150 years, architects and engineers involved in the preservation of historic concrete structures need to understand the material of the period and the manner of its making and use. Therefore, a set of evaluation procedures and conservation strategies for the preservation and repair of these structures is proposed. This handbook is intended to assist those lay persons who have responsibility for administration of historic resources or whose duties involve making decisions about their care and maintenance.

Full text:

<http://www.doc.govt.nz/upload/documents/science-and-technical/sap248entire.pdf>

3. FUTURE ENGINEERING HERITAGE CONFERENCE TO BE HELD IN DUNEDIN IN 2009

3rd Australasian Engineering Heritage Conference

Engineering in the Development of a Region – Heritage and History

SALMOND COLLEGE, UNIVERSITY OF OTAGO, DUNEDIN, NEW ZEALAND 22–25 NOVEMBER 2009

This conference is part of a cycle of Australia & New Zealand engineering heritage conferences. There is a conference every other year, but most of these are held in one of the Australian cities. The 1st Australasian conference was in Christchurch 1994 and the 2nd in Auckland 2000. Previous Australian conferences include Sydney 2005 and Perth 2007. A preview of the next conference was presented at the Perth conference and liaison has continued between New Zealand (IPENZ) and Australia (EHA) Engineering Heritage groups.

The 3rd Australasian Engineering Heritage Conference is being planned for November 2009, in Dunedin, New Zealand. The Conference organisers are now inviting preliminary expressions of interest to participate, as registrants, as keynote speakers, as authors of papers or poster presentations, or to be on the pre-conference tour. Further information including the conference programme, pre-conference tour itinerary, call for papers and registration details will be provided from later this year.

An aim of this conference is to tell more about engineers, engineering achievements and their impacts on communities and people's lives. The themes and topics below are an indication of the proposed programme and the basis of a call for papers and invitations to keynote speakers.

Conference Themes and Topics include:

- **Agricultural Development** (irrigation & drainage; flood protection; refrigeration engineering; process industries; machinery; sawmilling; buildings)
- **Power** (hydro-electric; wind; steam; diesel; gas)
- **Transport and Communications** (roading; bridges; railways; shipping and shipbuilding; harbours and ports)
- **Resource Extraction** (Gold - mining; sluicing; dredging; tunneling; smelting. Coal. Scheelite. Oil shale)
- **The People** (entrepreneurs; communities; businesses; manufacturers; engineers; innovators)

These will be reviewed as we proceed.

Conference dates: Sunday 22nd November 2009 through Wednesday 25th November 2009.

Social gathering and welcome on Sunday evening.

3 days of sessions, including a Tuesday afternoon breakout for a local tour and a public lecture at a suitable engineering heritage venue.

4 day pre-conference tour Thursday – Sunday.

Co-hosted by Institution of Professional Engineers New Zealand (IPENZ) and History Department University of Otago

Further information will be available as conference planning proceeds.

Refer to IPENZ Engineering Heritage website: www.ipenz.org.nz/heritage or

Contact: Lloyd Smith, Chairman IPENZ Engineering Heritage Otago Chapter

64 Ann Street, Roslyn, Dunedin 9010, New Zealand

Email: EHConference09@ipenz.org.nz



September 2008

4. NEWS FROM THE CHAPTERS

4.1 ENGINEERING HERITAGE AUCKLAND CHAPTER

The Auckland Chapter is really fortunate to have a very enthusiastic committee who are at present busy writing about the engineering heritage of Auckland region with the intention of publishing a book in about 18 months.

John Fitzmaurice, who has been deeply involved in drainage issues in Auckland and elsewhere, completed his fascinating story about Auckland's waste water describing the politics and engineering involved in collecting and disposing of Auckland's sewage. The political controversy around the aborted Browns Island scheme is included and John describes how this led to the Mangere Sewage plant with its large oxidation ponds.

Les Jones, formerly Chief Engineer for Auckland Harbour Board has written about the development of Auckland Harbour from its very early days and its continuing vital importance to the region.

Mike Lancaster, formerly District Commissioner of Works in Auckland has prepared information about Auckland International Airport, Auckland's motorway system and the Auckland Harbour Bridge.

Sir John Ingram, formerly Managing Director of New Zealand Steel, has prepared information about New Zealand Steel and the Taharoa ship loading system and Bryan Bartley who leads the book project has information on Grafton Bridge ready for publication.

John Duder and Les Jones both of whom worked on the Tongariro Power scheme have been busy collecting information from others who were involved.

Alex Aitken a former District Commissioner of Works and Engineer in Charge of Waipapa Power Project, is writing about the Waikato hydro power stations and the many top Ministry of Works engineer's careers grew out of being involved in Waikato hydro stations. Alex has also researched Chelsea Sugar Works and Calliope Dock.

Rhys Thomas has been busy looking into Auckland early rail history.

Auckland City Council Heritage Manager, Nicola Short, is keen to tap into the expertise of the Auckland Chapter and is proposing to use a system for recording heritage buildings and sites similar in format to that used by Engineering Heritage committees. It is hoped Auckland City will help to provide suitable photographs for our book.

John La Roche December 2008

4.2 ENGINEERING HERITAGE CANTERBURY CHAPTER

The Canterbury Chapter have been busy identifying their Living Treasures so that oral histories can be undertaken.

4.3 ENGINEERING HERITAGE OTAGO/SOUTHLAND CHAPTER

The Chapter is continuing to research southern sites of significant engineering achievements. This includes information and photographs of early Dunedin City sites, which will assist with recording them and telling their stories through guided walks and

brochures.

The Chapter has been enquiring about preservation of records from businesses that have closed, amalgamated or been taken over. Some owners are aware of responsibilities, others are being encouraged to hand documents, plans, photographs and other material over to suitable archive repositories - for example, Hocken Library or Archives NZ.

Some local companies include Hillside Railway Workshops (their earlier history as part of NZ Government Railways); Burnside Freezing Works; Fisher & Paykel Taieri plant and the former Shacklocks of Dunedin.

Some interesting research has been done on Kincaid & McQueen a 19th century engineering firm in Dunedin and builder of large steam powered cranes, including a 40 ton slewing travelling crane for Oamaru Harbour. It was one of three similar cranes (the others went to Taranaki and Timaru) and was used for construction of the breakwater, for lifting and placing large concrete blocks. They also built gold dredges and other heavy machinery, as well as the Cumberland Street over bridge (c1886) which was believed to have used the first steel commercially produced in New Zealand.

Planning for the 2009 Engineering Heritage Conference in Dunedin is continuing, by a Chapter sub-group and with liaison with conference Co-hosts University of Otago History Department. Preliminary information is available on the IPENZ web site.

5. ENGINEERING HERITAGE BOARD

The EHB has met three times since its establishment and has focussed on thinking strategically about Engineering Heritage.

As a complete newcomer to the subject of heritage it has been rapid learning curve.

We have developed and approved an "EHB Strategic Plan 2008 - 2012" which sets four goals:

1. To enhance the standing of the engineering profession in society and position it as the leading profession in the delivery of a sustainable economy and environment.
2. Identify and publicise New Zealand's engineering heritage.
3. Record the biographic details of retired and eminent engineers.
4. Support and co-operate with individuals, organisations and institutions documenting, maintaining, educating and disseminating engineering heritage.

These led to specific Key Performance Indicators for the next year:

1. Recognition and recording of the contribution of historical and ongoing development of New Zealand:
2. Six major recognition projects (e.g. plaques, oral histories, booklets) completed
3. 50 new database entries
4. A strategy is developed to maximise the contribution of heritage to the public profiling.

Engineering Heritage is effective in education, introducing young people to ideas and technologies that underpin our everyday lives. The EHB wants to ensure the widest possible scope of engineering achievement is accessible and interpreted. At present there are notable gaps in our heritage coverage and some of them will require energy

and imagination to be filled. For example: How and where is food technology, a foundation of New Zealand's economy, represented as an Engineering Heritage achievement.

Having attended too many funerals lately, I am acutely aware of the need to capture the stories of our older engineers who are our "living treasures". I also realise that most of us who are involved with engineering heritage are older and that the future of engineering heritage as an activity requires the involvement of younger people. Suggestions, ideas and offers to help are welcome.

Rob Wilkinson

6. NEWSLETTERS RECEIVED AT IPENZ

There have been several newsletters come in to the office since the last newsletter was written. Engineering Heritage Australia is one and there are two from ICE. Engineering to 1990 has also been placed at the same location:

<http://www.ipenz.org.nz/heritage/newsletters.cfm>

To view e.direct go to: <http://www.ipenz.org.nz/ipenz/publications/ezone/>

7. RECOMMENDED WEBSITES

<http://www.contrafedpublishing.co.nz/Historical.html>

<http://www.doc.govt.nz/templates/MultipageDocumentPage.aspx?id=44034>

<http://www.doc.govt.nz/templates/summary.aspx?id=34003>

<http://www.doc.govt.nz/templates/defaultlanding.aspx?id=34000>

<http://www.international.icomos.org/home.htm>

http://www.iccrom.org/eng/02info_en/02_04pdf-pubs_en.shtml

<http://www.doc.govt.nz/templates/MultipageDocumentPage.aspx?id=44034>

<http://www.doc.govt.nz/templates/summary.aspx?id=34003>

<http://www.doc.govt.nz/templates/defaultlanding.aspx?id=34000>

<http://www.international.icomos.org/home.htm>

http://www.iccrom.org/eng/02info_en/02_04pdf-pubs_en.shtml