
**PUBLICATIONS
AND THESES**

1989



**NATIONAL UNIVERSITY
OF SINGAPORE**

Publications And Theses
(abstracts)
1989

National University of Singapore

Preface

Publications and Theses is now in its 23rd year of publication. This edition consists of abstracts of publications and theses which appeared in print between 1 January 1989 and 31 December 1989 (unless otherwise stated), the authors or joint authors of which were at the time staff members or postgraduate students of this University.

It is hoped that this book will keep members of this University informed of research done in areas outside their own fields and therefore encourage a multi-disciplinary approach to the solution of problems and research. An annual like this will also make others aware of the expertise available in this University, thereby providing opportunities for the promotion of ties and collaboration.

Enquiries on research collaboration may be addressed to: The Director, University Liaison Office, 3rd Floor, Administration Building, National University of Singapore, 10 Kent Ridge Crescent, Singapore 0511.

Other enquiries regarding the publication itself can be directed to: Mrs Maureen Rahim, at tel: 7722511.

Sample Entries

The following are some sample entries to help readers use the publication more effectively:

A: BOOK

Author
/ **Chua, B H.**
Title of book
/ *The Golden Shoe: Building Singapore's Financial District.* 112 pp.
No. of pages
Singapore: Urban Redevelopment Authority.
/ *Place of Publication*
/ *Publisher*

B: PART OF BOOK

Author
/ **Gupta, A.**
Title of article
/ Restructuring a Quarternary drainage system. In *Correlation of Quarternary Successions in South, East and Southeast Asia*, ed. N Thiramongkol, pp. 205–213. Bangkok: International Geological Correlation Programme and Chulalongkorn University.
Source
/ *Page nos. of contribution in book*
/ *Place of publication*
/ *Publisher*
/ *Editor*

C: CONTRIBUTION IN JOURNAL

Author
/ **Koh, T A.**
Title of paper
/ Self, family and the state: social mythology in the Singapore novel in English. *Journal of Southeast Asian Studies*, XX(2): 273–287.
Source
/ *Vol. no.*
/ *Series/issue no.*
/ *Page nos.*

D: CONFERENCE PAPER

Author / Title of paper / Source
Goh, H H.
 Diagnosis of endocrine disorders in human reproduction. In *3rd ASEAN Conference in Medical Laboratory Technology*, 16–20 July 1989, Singapore, p. 166. Singapore: Singapore Association for Medical Laboratory Sciences.
 Page nos. / Publisher

E: REVIEW

Author / Article reviewed
Murfett, M.
 Review of *Troubled Days of Peace: Mountbatten and South-east Asia Command, 1945–46*, by P J Dennis. *Journal of Southeast Asian Studies*, 20(1): 100–102.
 Vol. no. / Series/issue no. / Page nos. / Author/Editor of article under review / Source

F: OCCASIONAL PAPER

Authors / Title of paper
Toh, M H and L Low.
The elected Presidency as a safeguard for official reserves: what is at stake? Singapore: Institute of Policy Studies, National University of Singapore, Occasional Paper No. 1.
 Paper no. / Publisher

G: THESIS

Name of postgraduate student / Title of thesis / University from which degree is obtained
Nair, E.
 Stress inoculation in relation to war. PhD thesis, University of Nottingham.

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Faculty of Architecture and Building

school of architecture

Lam, K P and J D Harrison.

Towards a defects-free environment. *Building Technology and Management Journal*, ed. K H Tan, 15:17-22.

The building designer has a bewildering range of techniques and materials from which to choose, and untried juxtapositions of parts are a regular cause of defects in buildings. The article surveys some of the difficulties which arise in the design and construction processes. Some ways which may help reduce faults are suggested, including the use of performance specification and the establishment of a system to collate and disseminate first-hand knowledge of good practice, in the effort to achieve a defects-free environment.

Lip, E.

Feng Shui for Business (Feng Shui for commercial buildings). 106 pp. Singapore: Times Books International.

This book gives a definition of *Kanyu* (*feng shui*) and how it influences the design and landscape of buildings in South-east Asia, Japan and elsewhere. The historical background of urban design and town planning with reference to *Kanyu* is presented and illustrated with examples from numerous ancient cities including *Jiankang*, *Changan*, *Luoyang* and *Beijing*. Groupings of commercial buildings are discussed with numerous drawings of modern building complexes. The siting and ori-

entation of commercial buildings are discussed with numerous illustrations. The design of signboards and logos with reference to Chinese culture in terms of *yin/yang*, orientation, and colour scheme are also presented.

Powell, R.

Innovative Architecture of Singapore. 160 pp. Singapore: Select Books.

Innovative Architecture of Singapore shows the growing confidence and innovative ability of a generation of architects working in Singapore. Their architecture is indicative of several strands of innovation, all in one way or another responsive to the imperatives of climate or culture. There is an eclectic freshness about the buildings and, more importantly, they indicate a move away from uniform, assembly-line production and stereotyped architecture. As changing social values bring a questioning of western values, new buildings tend to reflect the plural cultural roots of Singapore's multi-racial society and a strong conservation movement is evident. At the same time, in reaction to the architectural idioms of the recent past, there are increasingly variegated forms of housing and a degree of humour in design. This book is the first which presents a critical assessment of the contemporary architectural works of Singapore and is also the first to introduce Singapore architecture to the international architectural community.

Powell, R.

Ken Yeang: Rethinking the environmental filter. 120 pp. Singapore: Landmark Books.

Ken Yeang's work can be related to an ideological shift in architecture which is happening beyond the borders of Malaysia. Many societies in the Third World are groping with the problem of modernisation and self-identity vis-à-vis a Western culture whose paradigms of the Modern Movement in architecture reign supreme. However, in the last decade, there has been a movement which recognises a shift from these universal absolute values towards a regional view. The most succinct summary of the dilemma which confronts nations rising from underdevelopment is by the French philosopher Paul Ricoeur, who points out the paradox: how to become modern and to maintain roots in one's cultural past. Although this is not specific to Malaysia where Ken Yeang works, a strong awareness of local and regional identity is a most useful quality to have in the 1980's.

Powell, R.

Los Leader: The architecture of Frank Gehry. *Interiors Quarterly*, Dec 1989: 32-36.

The architecture of Frank Gehry has been said to sense the depths of change in contemporary culture. It "makes poetry of the artificiality and accepts the rootlessness of Los Angeles culture and has the transitory nature of modern dance choreography". The work of Gehry since 1978 has seen a major shift from its root in Modernism, and the influences of Neutra and Frank Lloyd Wright to his present position as one of the much maligned and yet acknowledged leaders of deconstructivism. This essay examines the theoretical stance of Gehry within a contemporary discourse on architecture.

Powell, R.

Modern regional architecture in Singapore. *Singapore Institute of Architects Journal*, 153: 29-36.

This is made up of two extracts from the book *Innovative Architecture of Singapore*. The innovation contained in these buildings reflect a search for a regional architecture that emerges from a dialectic between modernism and tradition, between technology and craftsmanship, between universal values and indigenous culture.

Powell, R.

Regionalism as cultural regeneration. In *Proceedings of the Third International and Interdisciplinary Forum, Built Form and Culture Research*, 9-12 Nov 1989, Tempe, Arizona. Arizona, USA: Arizona State University.

Regionalism has many dimensions: political, economic, social, anthropological and architectural. This paper concentrates on one aspect, the response in architecture to a perceived shift in values away from universalism towards a regionally focused view of the world. The paper seeks to demonstrate that regionalism in architecture is partly an attitude which is axiomatically formed in relation to the international style within modernism but also that there is a deep-rooted desire in countries in the Third World and Newly Industrialised Countries to define an identity and to re-establish cultural continuity. The break in continuity with the cultural heritage is perceived to be the result of colonialism and/or rapid urbanisation. This has been exacerbated in many cases by so-called neo-colonialism. Regionalism is an architectural ideology which seeks to synthesise the tenets of modernism and the vernacular tradition. The paper places Asia in the context of the international debate on this issue. By identifying the architects whose work

express various strands of regionalism in architecture, a taxonomy of regionalism has been devised.

Powell, R (Technical Editor).

Space for Freedom. The Search for Architectural Excellence in Muslim Societies, ed. Ismail Serageldin. 304 pp. London: Butterworths.

This book, the third in the series "Building in the Islamic World Today", complements *Architecture and Community*, which covered the 1980 Aga Khan Award for Architecture and *Architecture in Continuity*, which illustrated the 1983 Award. The book is in three parts: the first is an introductory essay by Ismail Serageldin, a member of the Award Steering Committee. This is followed by a second part devoted to the 1986 Award winners. The third section provides a sample of the intellectual papers, reports and seminars that took place in the third Award cycle and which indicate the thrust of ongoing activities.

Powell, R and K S Tay¹.

The intelligent tropical city. *Singapore Institute of Architects Journal*, 157: 32–37. Singapore: Singapore Institute of Architects.

The Town Planning concepts of the tropical world are in most cases versions of the Town and Country Planning Acts of Northern Hemisphere countries introduced during the colonial period. The conflicts caused by intensive and rapid development in the post-colonial period have been exacerbated by the lack of new conceptual frameworks for the Tropical City. As populations expand and economies grow

there are exponential increases in the use of energy to ameliorate the negative impacts of heat, noise and dust. The tropicalised design of individual buildings can only go part of the way to resolving what is basically a problem of urban planning, environmental design and energy management. Reducing the need to travel is a basic strategy in the planning of the Tropical City. A strategy is also essential for energy optimisation: use of sun, wind, rain; land use; optimisation of cultural patterns; and ecological balance. The paper examines the parameters of the new paradigm for the Tropical City.

Powell, R and E Tracy².

The urban morphology of Singapore's Little India – meaning and values in urban form. *PLANEWS*, 12 (1): 23–35.

Urban Morphology is a way of looking at the physical form of the city which involves the analysis of the social, economic and historical processes. Morphological analysis has developed within the urban development and planning studies programmes on human geography. This paper examines "Little India" as an enclave in Singapore and seeks to appreciate it not just as a physical form, but as evidence of a sequence of processes and relationships through time. By understanding the city as an expression of value systems the urban designer can, in theory, extrapolate the values of the present society and prescribe appropriate forms.

Tay, K S³ and R Powell.

The Tropical City – a resource conserving approach to planning, 27–29 Jul 1989. 2nd International Urban Planning, Housing and Design Convention.

1 K S Tay – Architect in private practice.

2 E Tracy – Former teaching Fellow, School of Architecture, National University of Singapore.

3 K S Tay – Architect in private practice.

Singapore: Singapore Institute of Planners.

Ramaswamy, S D⁴ and S P Rao.

Rejuvenation of asphalt pavement surfacings by hot recycling-cost and conservation viewpoint. *Journal of the Australian Road Research Institute*, 19(4): 298–308.

Hot recycling of asphalt pavements has received considerable attention from highway authorities around the world over the past decade or so because of its simplicity and the benefits that it offers over the conventional fresh mix overlay. Hot recycling usually involves removing the old distressed surfacing partially or fully and constructing the new surfacing, reusing the materials that have been removed after rejuvenating them suitably. The main benefit of hot-mix recycling procedures is significant cost savings by way of conservation of natural resources and reduced energy consumption. In this paper, the authors briefly discuss hot-mix recycling procedures and include computations based on data collected from published case studies to illustrate the three potential benefits, namely energy savings, conservation of materials and overall cost reductions.

Rao, K R⁵ and S P Rao.

Condensation in buildings. In *Control of the External Environment of Buildings*, ed. Bill P P Lim, pp. 52–61. Singapore: Singapore University Press. Published in 1988.

Damage due to moisture is a universal problem. Modern buildings are extremely complex systems and hygro-thermal failures may result for several reasons. This article deals with the phenomenon of condensation and de-

tails design considerations to avoid the risk of condensation in buildings.

Rao, S P.

Comfortable conditions from new insulated cladding. *Buildings and Construction News*, 28 Sept 1988, pp. 16–17.

The paper describes the design and development of a room calorimeter and its successful application for developing a new type of insulated cladding utilising the property of a radiant heat barrier.

Rao, S P.

Environmental control and its place in urban design. In *Proceedings of the 2nd International Convention on Urban Planning, Housing and Design*, ed. Singapore Institute of Planners, pp. 495–513. Singapore.

The increased use of high-rise construction, with consequential adoption of cheaper, lighter and easier-to-erect building structures has led to monumental failures in indoor as well as outdoor environment around tall buildings. This paper reviews the causes and evaluates alternative design strategies to overcome the problems.

Wong, C T.

Architecture in Singapore: Avant garde or misappropriation. *Singapore Institute of Architects Journal*, 156: 44–55.

The paper is a critique of an article by Tay Kheng Soon entitled "Architecture in Singapore" published in *SIAJ*, Jan/Feb 1989. The paper addresses the misconceptions embodied in Tay's article. One example is Tay's claim that a design which responds to climate would bring about a new architecture. This paper advocates caution, as a call for

⁴ S D Ramaswamy – Staff member, Civil Engineering Dept, National University of Singapore.

⁵ K R Rao – Retired. Formerly Professor, School of Building and Estate Management, National University of Singapore.

designs to respond solely to climate is false and anachronistic to the sign of the times – that of the masses' desire for the tempered environment. Ultimately, it may be another exercise in

mystification as it allows architects to resurrect past forms and signs. Such an exercise would then affirm nostalgia and past glories, and would fail to address the real issues in architecture.

school of building and estate management

Betts, M.

The cost of tendering: is it worth it? In *Proceedings of the Joint Seminar on "To Build Cheaper or Better?"*, 8 December 1989. Singapore: Singapore Institute of Surveyors and Valuers/Singapore Institute of Building.

This paper comments on the way in which tendering is conducted in the public and private sectors of the Singapore construction industry. It includes a critical appraisal of how effective such procedures are for individual contractors, for the Quantity Surveying profession and for clients and the industry as a whole. The paper then concludes by arguing the case for changing the way in which tendering is carried out locally with the aims of reducing the costs to the industry, speeding up the process of procurement and creating an environment in which better quality construction can take place.

Betts, M.

The format and content of information retrieval. *Computer Integrated Construction*, 1(2): 17–24.

This paper documents the results of an extensive research project carried out by the author in the UK. The nature of the work was to study the information that is used and produced by building contractors in preparing and submitting estimates and tenders. The aim was to explore the potential for information

technology to be used in the management of this information. A particular objective was to enable contractors to make much more extensive use of data produced at the design stage by consultants. In attempting this, it was established that the information would need to be in a form which was as flexible as was possible. Relational databases were examined as a technology that appeared to offer the greatest scope for such flexibility.

Betts, M.

See page 14.

Betts, M and J Gunner.¹

The accuracy of building price prediction in Singapore. Singapore: School of Building and Estate Management, National University of Singapore, Occasional Paper No. OP 3/89.

During the design and tender stage of building projects, estimates of building price are made. The difference between these estimates and the actual price of building work is a measure of estimating accuracy. This paper examines the performance of a quantity surveying organisation in Singapore when estimating building prices at the detailed design stage. This is done through analysis of a sample of data relating to recent construction projects. The organisation's accuracy is compared with published material primarily from the UK.

1 J Gunner – Partner at Rider Hunt Levett and Bailey, Singapore.

Betts, M and W D McGeorge.²

A systems approach to life-cycle cost appraisal. *Australian Institute of Building Papers*, ed. P Williams, 3: 35–51.

This paper is concerned with the need to view risk management as an integral part of an overall systems approach to life-cycle cost appraisal, with the stress on the importance of risk identification as the critical component of risk management technique. The general characteristics of the risk identification process are described. This is followed by an outline of current methods for performing such a task. In doing so, reference is made to the experience gained from other industries. The paper concludes by proposing a conceptual framework for life-cycle cost appraisal based on a systems approach.

Betts, M and R W Pollock.³

The development of the performance concept in building education through inter-disciplinary project work. In *Proceedings of an International Workshop on the implementation of the Performance Concept in Building in Education and Training*, 14–15 February 1989, Lisbon, Portugal: International Council for Building Research.

The complexities surrounding the construction and use of modern buildings requires their procurement to be undertaken by teams of specialists. A common understanding of the required performance must exist between members of the team in order to achieve the prescribed building. Contractual procedures exist to regulate the activities of these teams. Such procedures, while creating a framework, do not necessarily lead to effective communication and a common understanding. In addition to providing information appropriate to their indi-

vidual disciplines, education for the construction professions must create the basis on which effective team action can be created. Inter-disciplinary project work provides opportunities for students to develop their own expertise and to develop an appreciation of the place of their own activities and those of the other professions within the teams.

Betts, M, K Mathur and G Ofori.

The current use of construction information systems. In *Proceedings of the First Institution of Engineers Singapore Information Technology Conference: The Construction Industry*, 25–27 May 1989, Singapore, 2: 75–86. Singapore: Institution of Engineers, Singapore.

This paper examines the nature of information systems that are in use in construction in a way that sets the context within which current and future information systems can be classified and described. This is done by examining current systems and describing and classifying their nature and purpose. The examination is at a conceptual level in presenting a classification of generic types of systems. It is also at a practical level in describing a number of indicative examples of applications and implementations in the UK. Some case studies of the nature, organisation and development at a national level of systems in Japan and Finland are included. This paper therefore describes the nature of the implementation of construction information systems, and provides a useful framework by which implementations in Singapore can be considered.

Betts, M, K Mathur and G Ofori.

Information Technology and the Construction Industry of Singapore: a

2 W D McGeorge – Curtin University of Technology, Perth, Australia.

3 R W Pollock – Robert Gordons Institute of Technology, Scotland.

Framework for a Communications Network. 80 pp. Singapore: School of Building and Estate Management, NUS.

This book discusses the need for, nature of, and benefits from the use of IT in the construction industry. It stresses the importance of a national framework for the industry, and presents a draft of such a framework. This is the School's contribution to the ongoing discussion on the use of IT in the construction industry. The book is aimed at policy makers, practitioners in both the public and private sectors, and administrators of IT implementation not only in Singapore, but also in other countries.

Briffett, C.

Challenges facing the development of the professional property manager. In *Proceedings of Strategic Premises Management Conference*, November 1989, Kuala Lumpur and Singapore, ed. K Alexander. Singapore: Institute for International Research.

The increasing complexity and sophistication of new buildings and their services provide many new demands for management. Accelerating rates of change of technology, design and fashion, establish a need to be constantly in tune with users' requirements. Rising standards of comfort, hygiene, and servicing exert increased pressures on owners. Unless these demands are met, buildings will quickly become expensive to run, difficult to let and impossible to manage. The modern-day property manager needs to have the necessary foresight to identify opportunities for improvement, an innovative flair to propose new arrangements and an entrepreneurial spirit to adopt new measures. Few have these attributes and generally act as caretakers, not initiators; as maintainers, not planners; and as maligners rather than designers. In facilities management techniques there

are many opportunities for property managers to employ more positive and creative attitudes. This paper reviews the opportunities available and suggests how they may be realised.

Briffett, C.

The diagnostic approach to solving building defects. *The Professional Builder*, 4(1): 5-8.

The recently introduced mandatory controls for conducting structural surveys of buildings in Singapore introduces the need for a coordinated approach. This article discusses the investigation procedures for inspection, identification and analysis of building defects and the criteria for designing remedial works and collating feedback. The pitfalls of surveying buildings are highlighted and a comprehensive professional approach is recommended.

Briffett, C.

The inspection and diagnosis of flat roof problems in tropical climates. In *Proceedings of Waterproofing in Tropical Climate Seminar*, October 1989. Singapore: Construction Industry Development Board/HDB.

Flat roofs are often considered the most vulnerable element to climatic degradation in buildings and it is not surprising that their performance is constantly in question and under scrutiny. Flat roof problems occur worldwide and building owners and researchers have been exercising their minds on the many problems for years. The results of investigations and subsequent recommendations for good practice have been valuable but often serve to reinforce the diversity and complexity of the problems, particularly in relation to performance in different climatic zones and variable micro climates. This paper attempts to identify common problems and provide solutions.

Briffett, C.

The performance of external wall systems in tropical climates. In *Proceedings of IFHP/CIB/WMO International Conference on Urban Climate, Planning and Building*, November 1989. Japan: International Council for Building Research Studies and Documentation.

Early failure in external wall systems of multi-storeyed buildings can incur high costs for maintenance and repair work. The prevention of rain penetration, control of temperature changes and resistance to pollution and climatic effects are vital requirements for achieving better performance. Imported technologies and materials are partially responsible for problems occurring but design, construction and maintenance processes also contribute. This paper presents a number of case studies specific to tropical climates which define common problems, determine particular causes and recommend suitable solutions.

Briffett, C.

The role of educating building professionals. In *Proceedings of the Implementation of Quality in Construction Symposium*, September 1989. Denmark: European Organisation for Quality.

Education is the most significant factor affecting quality in construction. Managers in the building industry require considerable skills and experience to make the right decisions, to initiate correct procedures and to produce a high quality product. The changing demands of society and its associated technology constantly provide challenges for educators to develop new courses, define new objectives and identify new roles and responsibilities. Educational and professional institutions should be more positive and creative in order to meet these needs. The future role of educat-

ing the building professionals is an issue that requires considerable attention, demands determined action and deserves priority treatment. This paper highlights the main problems and proposes possible solutions.

Dutt, A J.

Challenges for structural systems of supertall buildings in year 2000 and beyond. *Journal of the Institution of Engineers Singapore*, ed. C K Ang, 29(1): 61-64.

Gravity, wind and earthquake loads are the three major kinds of loadings which greatly influence the decision and choice of structural systems in the design of supertall buildings. The weight of the building and its contents are the principal loads due to gravity which are directly proportional to the height of the building. What makes a building tall or supertall is its response to lateral load which is due to wind velocity. The effects of wind loads are more critical in supertall buildings as they increase with the increase in the height of the building. The paper examines these problems and presents solutions so as to have an efficient structural system for buildings rising 100 to 200 storeys and above.

Dutt, A J.

Solving parking problems with current rising trend in car ownership. In *Proceedings of the Joint Seminar on "To Build Cheaper or Better?"*, 2 December 1989, ed. M T Lim, pp. 1-5. Singapore: Singapore Institute of Surveyors and Valuers/Singapore Institute of Building Ltd.

The paper deals with the current increase in car ownership in Singapore due to increased business activities in the commercial and industrial sectors. As a result, people have to maintain cars to meet their transport needs. In

public and private housing estates, a greater number of people own cars, but there is a shortage of parking space. To solve the problem, multi-storeyed car-parks need to be built. This can be achieved by using the industrialised building system which saves time and money.

Dutt, A J.

Wind resistant design of low-cost housing projects in hurricane prone areas. *International Journal for Housing Science*, ed. O Ural, 13(1): 79–86.

About 900 million people in hurricane prone areas around the world live in non-engineered low-cost houses, apartments and timber shelters. The majority of these dwellings which have been built by the occupants do not incorporate engineering principles and are not resistant to extreme winds. The paper deals with some of the problems that exist for low-income housing in the hurricane prone areas and recommends measures to be adopted.

Dutt, A J.

Wind tunnel modelling and simulation of building structures. In *Proceedings of the 20th Conference on Modelling and Simulation*, 4–5 May 1989, eds. W G Vogt and M H Mickle, pp. 813–817. USA: University of Pittsburgh.

The paper deals with the modelling and simulation requirements which are essential in order that the results of wind tunnel model tests can be used to predict the behaviour of full-scale buildings and structures in natural turbulent wind. To achieve this objective it is necessary to represent in the wind tunnel the relevant properties of both natural wind and the structure. The requirements of boundary layer simulation is dealt with in detail to achieve the objective. The paper presents the non-dimensional parameters for defining the prop-

erties of models and prototypes for static as well as dynamic similarity.

Dutt, A J.

Wind tunnel techniques for determination of aerodynamic drag on car and truck bodies. In *Proceedings of the Asia-Pacific Conference on Automatic Technology*, 27–29 April 1989, ed. K C Ng, pp. 1–8. Singapore: Singapore Centre of the Institute of Motor Industry.

Accurate determination of aerodynamic drag on a car body is extremely important. In order to reduce the value of coefficient of drag, a proper aerodynamic shape is essential which is arrived at by wind tunnel testing. Scale models are placed in the wind tunnels and ground effect is simulated by means of a moving belt. The paper deals with some of the techniques developed in recent years to provide for proper simulation by which considerable economy in fuel consumption can be achieved and, at the same time, an aesthetically pleasing shape of car can be maintained.

Dutt, A J and T George.

Case history of wind-induced failure of a bridge structure. In *Proceedings of the International Conference on Case Histories in Structural Failure*, 20–22 March 1989, ed. Y S Lan, pp. C39–C46. Singapore: Singapore Concrete Institute.

This paper deals with the case history of the wind-induced structural failure of the Tacoma-Narrows suspension bridge in the USA in 1940. The cause of the failure was coupled vibration in bending and torsional mode. This phenomenon is described in detail and the methods for preventing such failures in future are presented.

Dutt, A J and S K Roy.

Appraisal and assessment of wind-induced damage of buildings and structures. In *Proceedings of the Interna-*

tional Conference on Inspection, Appraisal, Repair and Maintenance of Buildings and Structures, 19–20 January 1989, ed. J Tan, pp. 74–82. Singapore: American Concrete Institute.

The paper deals with the appraisal of wind-induced damage caused by intense suction on roofs and pressure on walls of buildings and structures. Damage and failures caused on industrial structures are also investigated and the method of repairing and preventing such damage and failures are presented.

Field, B G.

Controlled urbanisation: a planned approach to the housing crisis. *International Journal for Housing Science*, ed. O Ural, 13(3): 233–242.

This is a reprint, for a wider international readership, of a paper first presented at the 15th International Association of Housing Science World Congress. In dealing with housing stress in developing countries, there appears to be a broad consensus behind strategies which are essentially self-help in nature, e.g. sites and services programmes, *kampung* improvement schemes and the like. Very few cities have made use of public housing to solve their housing problems and, in this respect, Singapore is quite unique. The country's quantitative achievements in the field of public housing have, indeed, been impressive and this paper focuses on the extent to which success has been based on the acceptance of town planning and the ideology of high-rise building. This has facilitated a multi-nuclei urban pattern of self-contained developments at relatively high densities, interconnected by a good transport network. Such a spatial pattern may prove a better alternative to the accommodation of growth than the centreless sprawl, at lower densities, which characterises many other cities in the developed and developing world.

Field, B G.

Equity and efficiency in transport planning. In *Proceedings of the Second International Convention on Urban Planning, Housing and Design*, 27–29 July 1989, pp. 273–286. Singapore: Singapore Institute of Planners and Applied Technology Pte Ltd.

This paper focuses on Singapore's comprehensive and apparently integrated approach to transport planning. A policy of vehicle restraint and the promotion of public transport has been assiduously pursued – such an approach appears to be no more than a vain panacea in other major cities of the world. Nevertheless, and notwithstanding the desirability of the overall strategy, circumstantial evidence points to internal contradictions within the package of actual policy prescriptions which may, in implementation, give rise to problems of allocative inefficiency and inequity. This is not to imply that the system needs radical restructuring but, since the principal objective is to improve the utilisation of resources within given environmental constraints and subject to appropriate distributional criteria, there does appear to be scope for further "fine tuning". The paper highlights selected areas of concern and suggests, where necessary, what ameliorative action might be taken.

Field, B G.

Public housing and the promotion of home-ownership. In *Innovative Housing Practices*, eds. V Abrantes and O Ural, pp. 343–348. UK: Pergamon Press.

Singapore has been remarkably successful in implementing a public housing programme which, by virtue of its scale and momentum, has not only transformed the urban fabric to create a new and better living environment, but has also become the decisive force in improving the well-being of the populace. Housing has been promoted as an inte-