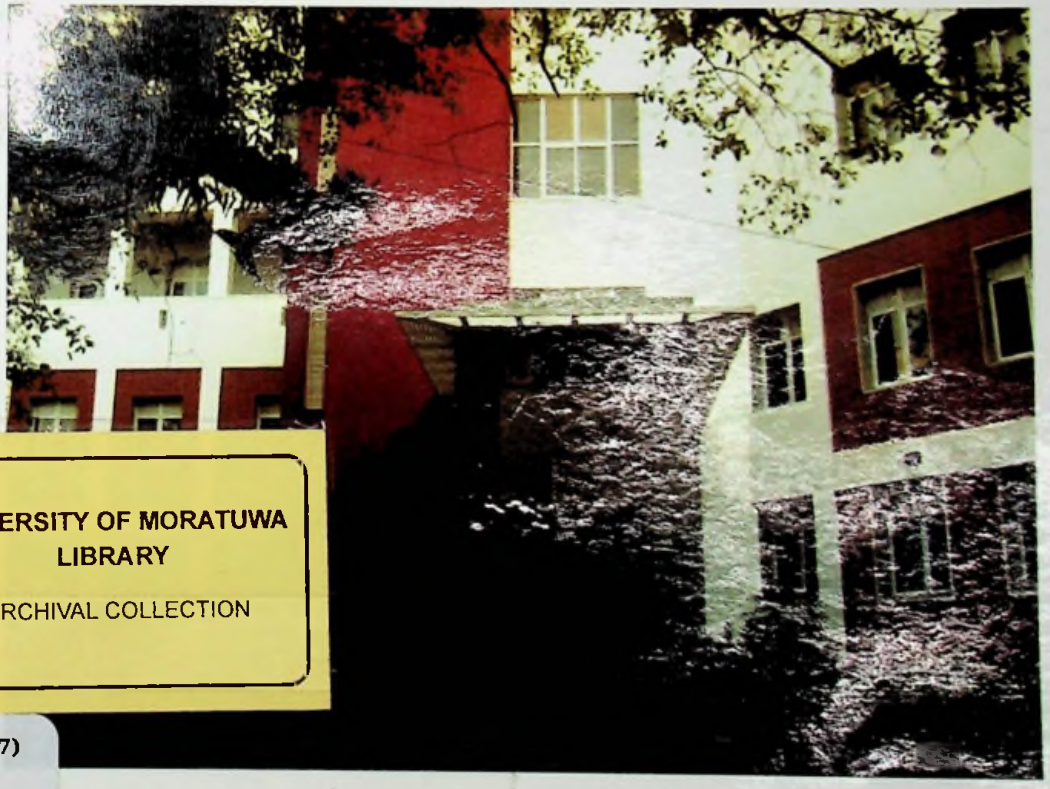
Proceedings of Civil Engineering Research Symposium 2014

(CERS 2014)



14th March 2014

Department of Civil Engineering
University of Moratuwa

CIVIL ENGINEERING RESEARCH SYMPOSIUM-2014

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Sri Lanka

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Published by the Department of Civil Engineering

Faculty of Engineering

University of Moratuwa, Katubedda, 10400, Moratuwa, Sri Lanka

Message from Head/ Department of Civil Engineering

The first Civil Engineering Research Symposium (CERS) was held in 2011 as a forum for disseminating research findings of mainly UG and PG research carried out in the department for the industry and for mutual exchange of views among engineers, researchers and academics. Since then it has become an annual event of the department.

The role of a university is not only disseminating knowledge but also creating new knowledge through research at the highest possible level. Our research findings should be useful for the industry and society; and to develop the country and uplift the standard of living of people. Around the world, countries have recognised that universities, especially research universities, are the key to the knowledge economy of the 21st century.

Our staff members are very active in applied research in a wide spectrum of civil engineering specialities such as Building and Structural Engineering, Construction Engineering & Management, Environmental Engineering, Geotechnical Engineering, Hydraulic & Water Resources Engineering and Transportation Engineering. As a department as well as individual staff members, we have established collaborative research links with the industry, local research organizations and foreign universities. In 2013, a partnership agreement was signed between University of Moratuwa and Holcim (Lanka) Ltd to support the department of civil engineering through collaborative research especially in the areas of cement and concrete. Two other companies have also indicated their willingness to sign similar agreements to sponsor collaborative research work.

Final year undergraduate research projects have played an important role in establishing the research culture in the department. These were started as group research projects, but from last year, individual research projects were introduced to give more exposure for students to carry out an independent study.

The department is conducting 12 postgraduate taught courses, where the research project is a significant component in the M.Eng/MSc degree programmes. Currently there are about 200 PG students registered for postgraduate studies and out of those 40 are research students reading for M.Sc, M.Phil and PhD degrees. As a part of promoting research culture, the department conducts monthly research seminars where not only full time PG research students but also staff members present their findings of ongoing research projects to staff and students of the department; this helps the students tremendously to improve their research methodology, and enhance their presentation preparation and communication competencies.

These proceedings contain 18 research papers mainly based on UG research work. All the papers have gone through a double-blind peer review process to ensure the quality of publications.

A lot of people have helped and worked hard to produce a successful technical programme and symposium proceedings for CERS 2014. I would like to thank all the authors for submitting their papers, the keynote speaker Dr. Mervyn Gunasekera, the Chairperson and committee members of the conference committee, and the reviewers who carried out the most difficult task of carefully evaluating the submitted papers. I would also like to thank Holcim (Lanka) Ltd for their financial support.

Prof. S. M. A. Nanayakkara
Head/Department of Civil Engineering

Message from Dean, Faculty of Engineering

I wish to congratulate the Department of Civil Engineering of the University of Moratuwa for organising the "Civil Engineering Research Symposium 2014 (CERS 2014)" scheduled in March 2014, at the Department of Civil Engineering, Faculty of Engineering, University of Moratuwa, Sri Lanka. It is glad to note that a trend of annual research symposium has developed in the Department, commencing with the first symposium in 2011.

CERS 2014 forms a platform to bring together the alumni, the staff and the undergraduate students of the Department, for sharing their views on the status of the Civil Engineering Research focused on Industry. With the current level of activities in the civil engineering sphere in the country, fuelled by large-scale national infrastructure development projects, this symposium is of particular importance to civil engineers in the industry and undergraduates alike.

The Department has taken many steps in recent years to enhance its teaching and research profile, and has been the pioneer and leader in postgraduate education in engineering at the University of Moratuwa. In addition, the staff provide advice and expertise to the state sector on technological and policy matters while engaged in research and consultancy services for the civil engineering industry. The undergraduates receive good exposure to the industry throughout. It is my wish that this Symposium, while disseminating new knowledge, would further the desire for conducting applied research in the field of civil engineering.

I wish to convey my thanks to Prof. Anura Nanayakkara, Head, Department of Civil Engineering, Dr. Udeni Nawagamuwa and Dr. Nalin De Silva, Symposium Secretaries, and the Organising Committee, for organising the Civil Engineering Research Symposium 2014.

Prof. U. G. A. Puswewala
Dean, Faculty of Engineering
07 March 2014.

Message from the Vice-Chancellor

Civil Engineering Research Symposium (CERS) has now become an important annual event of the Department of Civil Engineering. I was very pleased to note the enthusiasm of the Department to organize this focused research symposium demonstrating its individual contribution for university research. The Department of Civil Engineering is therefore a trend setter for the other departments to drive research and to hold focused research symposia.

One of the goals that the University strives to achieve is to have a thriving and sustainable research and innovation culture in our march towards a world class university. To this end, attempts are made to attract funding from international offers, private sector funding leveraging 300% tax concession for research investment, international collaborations and funding from other local institutions in addition to enhanced Senate Research Grants this year. This is a great opportunity for Civil Engineering Department to significantly contribute for development of alternative/new materials, new construction technologies, new building components to support rapid infrastructure development of our country which is a pre-requisite for our march towards a middle income nation.

It is my hope that this Symposium will not only disseminate Civil Engineering research findings but also create further opportunities to identify new directions, obtain ideas for more development oriented research and attract further research funding.

While expressing my appreciation to the Head/Department of Civil Engineering and the organizing committee for dedicatedly organizing this Symposium, congratulating the authors of the papers for their achievements, I wish Civil Engineering Research Symposium (CERS) 2014 a great success.

Prof. Ananda Jayawardane
Vice-Chancellor

Acknowledgement

Civil Engineering Research Symposium -2014 is the successor to the two symposia *Civil Engineering Research for Industry* held in 2011 and 2012. This year, the papers are mostly being presented by the undergraduate Civil Engineering students and their supervisors, which is a deviation from the past practice. The intention is to give the students a chance to display their research capabilities both in the written and oral forms, be refereed through a double blind refereeing process, and be exposed to a professional audience to defend their work, just before they step into the world of work as engineers. The success of this one day symposium is a joint effort of the academic staff members and the students of the Department of Civil Engineering, University of Moratuwa, the referees of research papers who volunteered their time and expertise to complete the referee process to a very tight time schedule, and the distinguished invitees who actively participated in the discussions. Their contributions are greatly appreciated.

The Keynote Speaker for today's event, Group Captain Eng Dr. Mervyn Gunasekera, Past President of the Institution of Engineers Sri Lanka and Managing Director of LAN Management Services willingly agreed to take time off his very busy schedule to participate in the Symposium at our invitation. We are grateful to Dr. Gunasekera for sharing his vast experience with us during his Keynote address.

This symposium is held with the blessings of the Vice Chancellor and the Dean of Faculty of Engineering. The organizers of the symposium wish to thank the Vice Chancellor for granting permission to have this event at the Department of Civil Engineering. The organizers also wish to thank the Dean, Faculty of Engineering for his wholehearted support.

A symposium of this nature will be successful only if it is well attended. All the delegates from other universities and the industry who participated in this symposium are appreciated for devoting their valuable time amidst their busy schedules.

Special thanks are due to the authors of the papers and the editorial panel led by Dr. Premini Hettiarachchi for their tireless efforts to finalize the papers. The organizers appreciate the dedication of the referees very much and hope that they would extend similar support in future as well.

Academic staff members were amply supported by many other members and research students of the Department of Civil Engineering in organizing this symposium. A special thank you is due to Prof. S. M. A. Nanayakkara for designing the cover page. Ms. Sanduni Gunaratne, Ms. Maneesha T Dodangoda and Ms. Nilakshi Perera assisted the organization and also printing of the proceedings.

The organizers also wish to thank all those who assisted in numerous ways and hope that their unfailing support could be expected in the future as well.

Last but not least, we wish to extend our heartfelt gratitude to our principal sponsor of the event, Holcim Cement, for their generous contribution.

On behalf of the Organizing Committee,

Prof. (Mrs.) N. Ratnayake (Symposium Chair)
Dr. Udeni Nawagamuwa and Dr. Nalin de Silva (Symposium Secretaries)
14th March 2014.

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