At the Geotechnical and Geoenvironmental Engineering Research Group, School of Engineering, Edith Cowan University, we work on cost-effective, environmentally friendly and sustainable solutions to the problems in the broad area of civil engineering practice known as the Geotechnical and Geoenvironmental Engineering. We collaborate with several global universities, research institutions, industries and individuals on academic and field projects.

Our Focus

Our current research focuses on several specific topics, such as geosynthetic applications in civil and mining engineering projects, fibre-reinforced soils, slope stability under static and dynamic loading conditions, engineered landfills, buried structures, static and dynamic earth pressures, utilization of mine and other wastes in construction, mine stopes, pavement structures, and ground improvement techniques.

We have recently identified some new areas for extending our research focus, such as soil-cement (cement may be waste cementitious materials from industries), biocementation (changing loose/weak geomaterials to dense/hard geomaterials by biological activities), soil erosion and air pollution, waste management, effect of climate change on geomaterials and geotechnical structures, effect of sea level rise on tunnels and other buried structures, sustainable construction materials, reduction of carbon footprint in geotechnical construction, geological aspects of geothermal energy, rehabilitation/closure of old mines and landfills, mine excavation and mineral processing (geotechnical/geoenvironmental engineering aspects), and analysis and design of tailing dams.
Our Research Success

We have recently developed many new engineering concepts for applications in field projects. Reinforced soil is a composite construction material formed by combining soil and reinforcement. Predicting the strength behaviour of the fibre-reinforced soils has been a challenging task for civil engineers since its development. This problem has been recently solved by developing a simple mathematical model.

Analytical expressions for the total active and passive thrusts from the backfills have been quite popular among engineers for designing retaining structures since their development. In most real-life projects, the backfills are $c$-$\phi$ soils. Estimating the dynamic active thrust on the retaining structures from such soil backfills has not been possible by analytical methods considering both horizontal and vertical seismic loadings. The research group has presented analytical expressions for different field situations. Shukla's generalized expression for seismic active thrust (2015) and Shukla's generalized expression for seismic passive resistance (2013) are routinely used by practicing engineers worldwide for designing the retaining structures, in place of the classical Mononobe-Okabe (MO) expression (1924-1929), and Mononobe-Okabe-Kapila (MOK) expression (1962). Some of the special cases of Shukla’s expressions (2013, 2015) developed earlier have also been described in significant details in US-based popular Geotechnical Engineering books as well as in the popular Soil Dynamics book as mentioned earlier. The researchers have started to compare their results obtained by numerical methods. Some researchers have also derived Shukla’s generalised expressions by different approaches, as can be seen below:


Derivation of Shukla's generalized expression of seismic passive earth pressure on retaining walls with cohesive-frictional backfill by the inclined slice element method - ScienceDirect

www.sciencedirect.com

Shukla developed a generalized expression for the dynamic passive earth pressure from cohesive-frictional soil backfill by considering the equilibrium of a passive failure wedge (International Journal of Geotechnical Engineering 2013; 7(4): 443–446).
Shukla developed an explicit generalized analytical expression for dynamic active thrust on the retaining wall from cohesive-frictional soil backfill subjected to seismic loads by considering the equilibrium of an active failure wedge.

Other areas where our research group has created innovative research outcomes are strengthening the foundations by the Shukla’s wraparound technique, seismic slope stability, mine stopes stability, soil arching concept, rock slope stability, airport pavement deflection, evaluation of elastic constants, buried conduits covered with geosynthetic-reinforced granular fills, mine waste utilization, electrical characterisation of geomaterials, etc. Some recent publications are listed below (see the publication list for recent five years at the research group leader’s profile page; ask for the complete publication list by sending email at: s.shukla@ecu.edu.au; sanjaykshukla1@gmail.com):

**Recent Books**


Selected Research Papers


Research Team

Research Group Leader
Sanjay Kumar Shukla
PhD, M Tech, BSc Eng, FIE Aust, FIE (India), FIGS, MASCE, MIGS, MIRC, MISRMTT, MISTE, MCAII

Founding Editor-in-Chief, International Journal of Geosynthetics and Ground Engineering, Springer International Publishing, Switzerland

Senior Editor (Civil and Environmental Engineering), Cogent Engineering, Taylor and Francis, UK


Regional Editor (Australia) as an Editorial Board Member, Soil Mechanics and Foundation Engineering, Springer, Moscow, Russia

Associate Editor (Geoenvironmental Engineering, Geomechanics & Geotechnics), Arabian Journal of Geosciences, Springer International Publishing, Germany

Founding Research Group Leader (Geotechnical and Geoenvironmental Engineering), Discipline of Civil and Environmental Engineering, School of Engineering, Edith Cowan University, Joondalup, Perth, Australia

Adjunct Professor, School of Building and Civil Engineering, Fiji National University, Suva, Fiji

Distinguished Professor, Department of Civil Engineering, Institute of Engineering and Technology, Chitkara University, Himachal Pradesh, India

Adjunct Professor, Department of Civil Engineering, School of Civil and Chemical Engineering, VIT University, Vellore, Tamil Nadu, India

Adjunct Professor, Department of Civil Engineering, VR Siddhartha Engineering College, Vijayawada, India

Advisor (Geosynthetics and Ground Engineering), Floodkon Consultants LLP, Roorkee, India

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Ms P.P. Sahoo, PhD Candidate, Edith Cowan University, Joondalup, Perth, Australia  
Mr M.U.A. Khan, PhD Candidate, Edith Cowan University, Joondalup, Perth, Australia  
Mr M.N.A. Raja, PhD Candidate, Edith Cowan University, Joondalup, Perth, Australia  
Mr Shunxing Liang, PhD Candidate, Edith Cowan University, Joondalup, Perth, Australia  
Ms M. Singh, PhD Candidate, Delhi Technological University, Delhi, India  
Mr M.K. Kalara, PhD Candidate, Delhi Technological University, Delhi, India  
Mr A. Jain, PhD Candidate, Indian Institute of Technology, Roorkee, India

**Former Postdoctoral Candidates**

Dr G.L. Le, Edith Cowan University, Joondalup, Perth, Australia, currently Lecturer at the Department of Civil Engineering, Can Tho University, Can Tho, Vietnam  
Dr P.K. Sharma, Edith Cowan University, Joondalup, Perth, Australia, currently Associate Professor at the Department of Civil Engineering, Indian Institute of Technology, Roorkee, India  
Dr V.A. Sawant, Edith Cowan University, Joondalup, Perth, Australia, currently Associate Professor at the Department of Civil Engineering, Indian Institute of Technology, Roorkee, India

**Former PhD Candidates**

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Dr L.M.S. Pandey, Edith Cowan University, Joondalup, Perth, Australia  
Dr F.A. Kuranchie, Edith Cowan University, Joondalup, Perth, Australia  
Dr M. Kazi, Edith Cowan University, Joondalup, Perth, Australia  
Dr L. Borana, The Hong Kong Polytechnic University, Hong Kong  
Dr C.H. Ting, James Cook University, Townsville, Australia  
Dr A. Kanoungo, PhD Candidate, Chitkara University, Himachal Pradesh, India

**Research Collaborators**

Dr Jian-Hua Yin, Professor, The Hong Kong Polytechnic University, Hong Kong  
Dr Ashutosh Trivedi, Professor, Delhi Technological University, Delhi, India  
Dr Bujang B.K. Huat, Professor, University of Putra Malaysia, Serdang, Selangor, Malaysia  
Dr Yogendra Singh, Professor, Indian Institute of Technology, Roorkee, India  
Dr Chandresh H. Solanki, Professor, S.V. National Institute of Technology, Surat, India  
Dr Denis Kalumba, Professor, University of Cape Town, Cape Town, South Africa  
Dr Varinder S. Kanwar, Vice-Chancellor, Chitkara University, Himachal Pradesh, India  
Dr Utpal Kumar Das, Professor, Tezpur University, Assam, India  
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Mr. Leki Dorji, Lecturer, College of Science and Technology, Thimphu, Bhutan  
Mr Sateesh Kumar Pisini, Principal Lecturer, Fiji National University, Fiji  
Mrs Swetha Priya Thammadi, Lecturer, Fiji National University, Fiji  
Dr D. Raj, Research Associate, Indian Institute of Technology, Roorkee, India  
Ms M. Bharathi, PhD candidate, Indian Institute of Technology, Roorkee, India  
Mr C. Doley, PhD Candidate, Tezpur University, Assam, India
Dr Sanjay Kumar Shukla, the Research Group Leader of Geotechnical and Geoenvironmental Engineering Research Group at the School of Engineering, Edith Cowan University, has established an international team of world-leading researchers in January 2015 to lead the research as the Founding Editor-in-Chief in the area of geosynthetics and ground engineering at the global level by developing a Research Journal with new concepts and several special features of practical importance as the *International Journal of Geosynthetics and Ground Engineering*, which is being published by Springer International Publishing, Switzerland. This journal has been benefiting the researchers worldwide significantly in several ways, and so this journal has now become the first publication platform for the researchers for their high-quality research works.

More details about this journal can be found at: [http://www.springer.com/engineering/civil+engineering/journal/40891](http://www.springer.com/engineering/civil+engineering/journal/40891)

**Contact Details**

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