



**DIPARTIMENTO DI STRUTTURE PER L'INGEGNERIA E L'ARCHITETTURA
CORSO DI DOTTORATO DI RICERCA IN
INGEGNERIA STRUTTURALE GEOTECNICA E RISCHIO SISMICO**

XXXVI CICLO

Il sottoscritto prof. Claudio Mancuso, PO afferente al Dipartimento di Ingegneria Civile, Edile e Ambientale (S.S.D. ICAR 07 – GEOTECNICA)

CHIEDE

di essere inserito tra i possibili tutor di studenti di dottorato per il XXXVI ciclo.

1. Curriculum sintetico del proponente

Claudio Mancuso was born in Naples (Italy) on May 22nd 1960. He took the degree of Civil Engineer on 1987 with full marks and honours. Mancuso took the degree of Research Doctor in Geotechnical Engineering at the University of Rome "La Sapienza", defending the final dissertation "In-situ measurements of soil properties through dynamic tests". On 1992 C. Mancuso got a permanent position as Researcher at the Department of Geotechnical Engineering. On 2001 he was appointed as Associate Professor at the same Department. In 2008 C. Mancuso was designated as Full Professor at the Department of Hydraulic, Geotechnical and Environmental Engineering (DHGEE), institution resulting from the fusion of the departments for Geotechnics and Hydraulics of UNINA. From 2008 to 2012 C. Mancuso has been Director of the Department of Hydraulic, Geotechnical and Environmental Engineering. From 2009 to 2013 he was Coordinator of the Doctorate in Geotechnical Engineering of the University of Naples Federico II. From 2012 to 2013 he was Coordinator of the School of Doctorate in Civil Engineering at UNINA. Currently, he is member of the Doctorate in Structural, Geotechnical and Seismic Engineering at UNINA.

Since 1999 C. Mancuso is one of the Italian Representatives (up to 2010 Core Member) of the Technical Committee n. 6 (Unsaturated Soils) of the International Society for Soil Mechanics and Geotechnical Engineering (committee nowadays listed as TC 106 by the ISSMGE). He was a member of the Scientific Committee and actively cooperated in the organisation of several national and international workshops and conferences. C. Mancuso was chairman and responsible of the organisation of the II European Conference on Unsaturated Soils held in Naples (Italy) on 20-22 June 2012. C. Mancuso participated in several national research projects with the 'CNR', the 'Ministero dei Beni Culturali' and the 'Servizio Dighe'. C. Mancuso has been Scientist in Charge at UNINA within the framework of the Marie Curie Research Training Network MUSE (Mechanics of Unsaturated soil for Engineering) between UNINA and several recognised institutions across Europe, and was Scientist in Charge at the UNINA for international based grants funded by the European Commission. The main areas of research activities of C. Mancuso are: (a) the development of equipment and testing procedures for in-situ and laboratory characterisation of the mechanical response of soils in the small-to-medium and in the large strain ranges; (b) theoretical studies on saturated and unsaturated soil mechanics; (c) the development of experimental devices and procedures for the study of the small, medium and large strain behaviour of soils in suction controlled conditions; (d) theoretical and experimental studies on the behaviour of several soils in saturated and unsaturated conditions; (e) the use of the experimental results for the analysis of static and dynamic boundary value problems. C. Mancuso appears as author of several papers published on international research journals, of scientific books and chapters of scientific volumes, of a number of papers published on the proceedings of national and international conferences and of a several of contributions to meetings of the Italian researchers in geotechnical engineering.



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2. Dottorandi dei quali il proponente è stato tutor nell'ultimo triennio	
n. 1	Roberta Ventini, Borsa di Ateneo (in co-tutorato con A. Flora)

3. Titolo della ricerca proposta
Risk Assessment of Earth Dams and River Embankments to Earthquakes and Floods

4. Area tematica
Ingegneria Geotecnica

5. Sintesi del progetto di ricerca
The aim of the project is the development of diagnostic and operational tools finalized to (i) assess the resistance of earth dams and river embankments to earthquakes and flood waves and (ii) support local governments to draw their resilience action plans. Assessment of the present safety conditions and preservation of earthworks used for hydraulic regimentation should be a priority in sound land use management, considering their vital role for our territories. A higher concern is felt considering that many old earth structures still in operation were built according to empirical rules, lacking of modern geotechnical criteria, and that their failure may have catastrophic consequences. The presence of earth dams of significant height and/or reservoir volume, small dams and levees, smaller in size compared to dams but characterised by significant longitudinal extension, could be considered an undeniable benefit for supplying water and energy, but, at the same time, constitutes a definite risk with respect to the safety of settlements located in areas that may potentially be flooded. The statistics of disaster caused by the collapse of water retention (http://www.damsafety.org) or levees is just impressive. The partial collapse of a dam or a levee embankment can be caused by hydraulic fracturing, concentrated or extended erosion, suffusion, piping, global instability or liquefaction, that may be triggered and evolve during operation, seismic and post-seismic stages. The vulnerability of new structures toward such hazards can be controlled by proper design and construction methodologies. However, many existing dams and levees do not satisfy modern design criteria and they are susceptible to an increasing risk of instability. Based on the recognised expertise of the fresearchers participating to the project, the research aims to explore some aspects of considerable interest to the international scientific community, such as the static, hydraulic and seismic response of earthworks during the operational stage and the influence of embankment-atmosphere interaction. The research will be supported by a collection of data related to a number of well-documented case histories. Simulations and back-analyses of the hydro-mechanical behaviour of some selected typical cases will be carried out using advanced numerical models, calibrated on suction-controlled laboratory tests and small scale physical models as well as



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based on monitoring of real-size earth structures using advanced instrumentation. Finally, the project will deliver criteria to evaluate the effects of earthquakes and flood waves and to identify the risk parameters to be monitored on large and small earth dams and levees, in order to improve the available design and analysis procedures and support the development of disaster risk reduction strategies.

The behaviour of earth structures subjected to seismic loading will be evaluated using different methods of analysis of increasing complexity and accuracy. Physical model tests will be carried out using the shaking table installed in the Italian seismic centrifuge, and the experimental results will form a database for future research, as no dynamic centrifuge test involving consideration of partial saturation has been performed so far.

6. Eventuali pubblicazioni del tutor sul tema di ricerca

1. Mancuso Claudio, Amorosi Angelo (2017). Prospettive nell'analisi del comportamento delle dighe di terra. Relazione Generale al XXVI Convegno Nazionale di Geotecnica - La Geotecnica nella Conservazione e Tutela del Patrimonio Costruito, vol. 1, p. 115-161, Roma: AGI - Associazione Geotecnica Italiana, ISBN: 978-88-97517-09-2, 20-22 giugno 2017 - Contributo in Atti di convegno
2. Domenico Gallipoli, A. Walter Bruno, Francesca D'Onza, Claudio Mancuso (2015). A bounding surface hysteretic water retention model for deformable soils. GEOTECHNIQUE, vol. 65, p. 793-804, ISSN: 0016-8505, doi: 10.1680/geot.14.p.118 - Articolo in rivista
3. A. Belardi, F. Colleselli, M. Ferrero, C. Mancuso, A. Nocilla, L. Pagano, A. Rosso (2014). Studio del comportamento idraulico degli argini dell'alto bacino del Po. In: Associazione Geotecnica Italiana. (a cura di): Associazione Geotecnica Italiana, Volume 2, XXV Convegno Nazionale di Geotecnica, La geotecnica nella difesa del territorio e delle infrastrutture dalle calamità naturali, vol. 2, p. 771-780, ROMA: Associazione Geotecnica Italiana, ISBN: 978-88-97517-05-4, Baveno, 4-6 giugno 2014 - Contributo in Atti di convegno
4. G. Calabresi, F. Colleselli, D. Danese, G. Giani, C. Mancuso, L. Montrasio, A. Nocilla, L. Pagano, E. Reali, A. Sciotti (2013). Research study of the hydraulic behaviour of the Po River embankments. CANADIAN GEOTECHNICAL JOURNAL, vol. 50, p. 947-960, ISSN: 0008-3674, doi: 10.1139/cgj-2012-0339 - Articolo in rivista
5. M. Biglari, A. d'Onofrio, C. Mancuso, A. Shafiee, M. K. Jafari (2012). Small strain stiffness of Zeno kaolin in unsaturated conditions. CANADIAN GEOTECHNICAL JOURNAL, vol. 49, p. 311-322, ISSN: 0008-3674, doi: 10.1139/t11-105 - Articolo in rivista
6. D'Onza F., Gallipoli D., Wheeler S., Casini F., Vaunat J., Khalili N., Laloui L., Mancuso C., Masin D., Nuth M., Pereira J.M., Vassallo R. (2011). Benchmark of constitutive models for unsaturated soils. GEOTECHNIQUE, vol. LXI, p. 283-302, ISSN: 0016-8505 - Articolo in rivista
7. M. Biglari, A. d'Onofrio, C. Mancuso, M.K. Jafari, A. Shafiee (2011). Modelling the initial shear stiffness of an unsaturated soil as a function of the coupled effects of the void ratio and the degree of saturation. COMPUTERS AND GEOTECHNICS, vol. 38 (2011), p. 709-720, ISSN: 0266-352X, doi: 10.1016/j.compgeo.2011.04.007 - Articolo in rivista
8. Tarantino A., Gallipoli D., Augarde C., De Gennaro V., Gomez R., Laloui L., Mancuso C., G. El Mountassir, Munoz J. J., Pereira J.M., Peron H., Pisoni G., Romero E., Raveendraraj A., Rojas J.C., Toll D., Tomblato S., Wheeler S. (2011). Benchmark of experimental techniques for measuring and controlling suction. GEOTECHNIQUE, vol. LXI, p. 303-312, ISSN: 0016-8505 - Articolo in rivista



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9. Pagano Luca, Mancuso Claudio, Sica Stefania (2008). Prove in sito sulla diga del Camastra: tecniche sperimentali e risultati. RIVISTA ITALIANA DI GEOTECNICA, vol. XLII, p. 11-28, ISSN: 0557-1405 - Articolo in rivista
10. J.C. Rojas, C. Mancuso, D. Danese (2010). Pre- and post-construction characterization of an embankment fill material. In: O. Buzzi, S. Fityus and D. Sheng. Experimental Studies in Unsaturated Soils and Expansive Soils. p. 455-460, CRC Press - Taylor & Francis Group, Balkema, ISBN: 9780415804806, Newcastle, Australia, 23-25 November 2009 - Contributo in Atti di convegno

7. Eventuali progetti di ricerca finanziati in cui l'attività si inserisce

PRIN: PROGETTI DI RICERCA DI RILEVANTE INTERESSE NAZIONALE – Bando 2017 Prof. 2017YPMBWJ
PART Research project title Risk Assessment of Earth Dams and River Embankments to Earthquakes and Floods

8. Eventuali fondi disponibili a supporto dell'attività del dottorando (escluso finanziamento borse)

Fondi progetto PRIN 2017 prof. 2017YPMBWJ, Risk Assessment of Earth Dams and River Embankments to Earthquakes and Floods

9. Informazioni relative ad un periodo di ricerca all'estero (minimo tre mesi) previsto per il dottorando

Allo stato attuale decisioni sull'argomento non sono ancora prese.

10. Eventuali collaborazioni con imprese/aziende sul tema di ricerca

Allo stato attuale non previste

Napoli, 08/01/2020

FIRMA

Claudio Mancuso