Proceedings of the Second International Conference on Press-in Engineering 2021, Kochi, Japan

edited by

Tatsunori Matsumoto • Katsutoshi Ueno Koichi Isobe • Hidetoshi Nishioka Koji Watanabe



PROCEEDINGS OF THE SECOND INTERNATIONAL CONFERENCE ON PRESS-IN ENGINEERING 2021, KOCHI, JAPAN



Organized by

International Press-in Association

Subsidized by

THE MAEDA ENGINEERING FOUNDATION THE KAJIMA FOUNDATION

Supported by

Asian Civil Engineering Coordinating Council

GIKEN LTD.

GIKEN SEKO CO., LTD.

International Society for Soil Mechanics and Geotechnical Engineering

Japan Construction Machinery and Construction Association

Japan Press-in Association

Japan Society of Civil Engineers

Japanese Technical Association for Steel Pipe Piles and Sheet Piles

Kami City

Kochi City

Konan City

Kochi Construction Industry Association

Kochi Construction Managing Engineers Association

Kochi Industrial Association

Kochi Institute of Invention and Innovation

Kochi Prefecture

Kochi Survey and Planning Association

Kochi University of Technology

National Institute of Technology, Kochi College

Shikoku Railway Company

The Kochi Shimbun

THE BANK OF KOCHI, LTD.

The Institution of Professional Engineers, Japan, Shikoku Regional Headquarters

The Japan Civil Engineering Consultants Association, Shikoku Branch

The Japanese Geotechnical Society

The Shikoku Bank, Ltd.

West Nippon Expressway Company Limited, Shikoku Branch

Proceedings of the Second International Conference on Press-in Engineering 2021, Kochi, Japan

Editors

Tatsunori Matsumoto

Kanazawa University, Japan

Katsutoshi Ueno

Tokushima University, Japan

Koichi Isobe

Hokkaido University, Japan

Hidetoshi Nishioka

Chuo University, Japan

Koji Watanabe

Aichi Institute of Technology, Japan



CRC Press/Balkema is an imprint of the Taylor & Francis Group, an informa business

© 2021 Copyright: International Press-in Association

Typeset by Integra Software Services Pvt. Ltd., Pondicherry, India

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without written prior permission from the publisher.

Although all care is taken to ensure integrity and the quality of this publication, no responsibility is assumed by the publishers nor the authors for any damage to the property or persons as a result of operation or use of the information in this publication.

Library of Congress Cataloging-in-Publication Data

Applied for

Published for: International Press-in Association

Address: 5F, Sanwa Konan Bldg, 2-4-3 Konan, Minato-ku,

Tokyo 108-0075, Japan Tel: +81-3-5461-1191

URL: https://www.press-in.org

ISBN: 978-1-032-10414-0 (Hbk) ISBN: 978-1-032-10416-4 (Pbk) ISBN: 978-1-003-21522-6 (eBook) DOI: 10.1201/9781003215226

Table of contents

Preface	xi
International advisory board	xiii
Organizing committee	XV
Administrative working group	xvii
Review policy and list of reviewers	xix
Invited lecture	
Design considerations for piles jacked or driven into strong soil or weak rock <i>M.F. Randolph</i>	3
Research and development for infrastructure maintenance, renovation, and management Y. Fujino & D.M. Siringoringo	14
State-of-the-art report	
State of the art report on application of cantilever type steel tubular pile wall embedded to stiff grounds J. Takemura	27
State of the art report on the use of press-in piling data for estimating subsurface information Y. Ishihara & O. Kusakabe	42
State of the art report on steel sheet pile method in geotechnical engineering-development of PFS method J. Otani	67
Session A: Pile performance Piling process	
Size effect of footing in ultimate bearing capacity of intermediate soil T. Iqbal, S. Ohtsuka, Y. Fukumoto & K. Isobe	89
Influence of end geometry on aged behavior of segmental jacked pipe piles in clay A.J. Lutenegger	98
Feedback on static axial pile load tests for better planning and analysis F. Szymkiewicz, A. Le Kouby, T. Sanagawa & H. Nishioka	105
Study of bearing capacity of tubular piles with diaphragm under pressing loads M.P. Doubrovsky & V.O. Dubravina	116

Results of static vertical load tests on tubular piles installed by Standard Press-in and Rotary Cutting Press-in K. Okada, K. Inomata & Y. Ishihara	124
The inner friction resistance and the resistance of an actual part of open-ended piles by the double-pipe model pile experiment H. Yamazaki, Y. Kikuchi, S. Noda, M. Saotome & M. Nonaka	131
The vertical and horizontal performance of pressed-in sheet piles T. Zheng, S.K. Haigh, A. Dobrisan, F. Willcocks, Y. Ishihara, K. Okada & M. Eguchi	138
Performance of pressed-in piles in saturated clayey ground: Experimental and numerical investigations L.T. Hoang, X. Xiong & T. Matsumoto	149
Proposal of vertical design bearing capacity estimation formula of Gyropress method based on Japanese railway standard T. Ozaki, T. Sanagawa, Y. Kimura & N. Suzuki	160
Comparison of SPT-based design methods for vertical capacity of piles installed by Rotary Cutting Press-in K. Toda, Y. Ishihara & N. Suzuki	169
An investigation into vertical capacity of steel sheet piles installed by the Standard Press-in Method K. Toda & Y. Ishihara	177
Predicting the capacity of push and rotate piles using offshore design techniques and CPT tests M.J. Brown & Y. Ishihara	185
Behaviour of three types of model pile foundation under vertical and horizontal loading W.T. Guo, Y. Honda, X. Xiong, T. Matsumoto & Y. Ishihara	194
Experimental study on the pile group effect in the horizontal resistance of spiral piles N. Ohnishi & H. Nishioka	203
Experimental observation on the ultimate lateral capacity of vertical-batter screw pile under monotonic loading in cohesionless soil A. Jugdernamjil, N. Yasufuku, Y. Tani, T. Kurokawa & M. Nagata	210
Experimental evaluation of the lateral capacity of large jacked-in piles and comparison to existing design standards A. Dobrisan, S.K. Haigh & Y. Ishihara	218
A study on analysis of horizontal resistance of screw coupled foundation with vertical and battered piles in cohesionless soil T. Kurokawa, Y. Tani, M. Nagata, A. Jugdernamjil & N. Yasufuku	224
Influence of horizontal loading height on subgrade reaction behavior acting on a pile A. Mohri, Y. Kikuchi, S. Noda, K. Sakimoto, Y. Sakoda, M. Okada, S. Moriyasu & S. Oikawa	235
Influence of different pile installation methods on vertical and horizontal resistances S. Moriyasu, M. Ikeda, T. Matsumoto, S. Kobayashi & S. Shimono	244
Stress changes in adjacent soils of tapered piles during installation into sand Y. Ishihama, S. Taenaka, Y. Sugimura & N. Ise	253

Comparison of penetration resistance and vertical capacity of short piles installed by standard press-in in loose sand Y. Ishihara, M. Eguchi, M.J. Brown & J. Koseki	260
Performance comparison of close-ended pressed-in steel pipe piles with helical pile in dense sand: An experimental study M.A. Saleem, K. Takeuchi, N. Hirayama, A.A. Malik & J. Kuwano	272
Discrete element modelling of silent piling group installation for offshore wind turbine foundations B. Cerfontaine, M.J. Brown, M. Ciantia, M. Huisman & M. Ottolini	279
Rehabilitation of brownfield sites using the Gyropiler to remove existing bored cast in-situ concrete piles J.P. Panchal & A.M. McNamara	289
Session B: Infrastructure development	
Numerical simulation for centrifuge model tests on cantilever type steel tubular pile retaining wall by rigid plastic FEM K. Mochizuki, H.H. Tamboura, K. Isobe, J. Takemura & K. Toda	297
Reliability analysis on cantilever retaining walls embedded into stiff ground (Part 1: Contribution of major uncertainties in the elasto-plastic subgrade reaction method) N. Suzuki, K. Nagai & T. Sanagawa	306
Reliability analysis on cantilever retaining walls embedded into stiff ground (Part 2: Construction management with piling data) N. Suzuki, Y. Ishihara & K. Nagai	315
Dynamic behavior of cantilever tubular steel pile retaining wall socketed in soft rock S.M. Shafi, J. Takemura, V. Kunasegaram, Y. Ishihama, K. Toda & Y. Ishihara	324
A centrifuge model study on laterally loaded large diameter steel tubular piles socketed in soft rock V. Kunasegaram, J. Takemura, Y. Ishihama & Y. Ishihara	334
Discussion about design method for embedded length of self-standing steel tubular pile walls pressed into stiff ground <i>T. Sanagawa</i>	345
3D fem analysis of partial floating steel sheet piling method on two-layered ground K. Kasama, H. Fujiyama & J. Otani	352
Experimental study for liquefied soil in a gap between underground walls K. Fujiwara & E. Mallyar	358
Model test on double sheet-pile method for excavation works using X-ray CT H. Sugimoto, S. Akagi, T. Sato, J. Otani, H. Nagatani & A. Nasu	364
A study on the effect an earth-retaining wall's rigidity and embedded depth on its behavior N. Matsumoto & H. Nishioka	375
Physical and numerical modeling of self-supporting retaining structure using double sheet pile walls A Nasy T Kohayashi H Nagatani S Ohno N Inova Y Taira T Sakanashi & Y Kikuchi	382

Study on liquetaction countermeasure method of river embankment using wood and sheet pile G. Hashimura, K. Okabayashi, D. Yoshikado & Y. Kajita	389
Session C: Disaster prevention and mitigation	
A preliminary numerical model for erosion at the flow-soil interface based on the sediment transport model Y. Yuan, F. Liang & C. Wang	403
Design calculation method for sheet pile reinforcement method in liquefiable ground K. Kasahara, T. Sanagawa & M. Koda	412
Anticorrosive effect by inserting sheet piles on the sides of underground tunnel at shallow depth M. Oka, H. Takeda, Z. Wang & K. Maekawa	420
Study on countermeasures for liquefaction of individual houses and backfill of quay using SandwaveG K. Okabayashi, F. Kawatake, Y. Tsuno & G. Hashimura	428
Study on a countermeasure method for liquefaction of fishing ports against the Nankai Trough Earthquake K. Okabayashi, G. Hashimura, A. Okubo, H. Ogasawara, S. Kadowaki & K. Tokuhisa	435
Experimental study on tsunami mitigation effect of pile-type porous tide barrier K. Toda, A Mori, Y. Ishihara & N. Suzuki	444
Session D: Case histories	
Press-in piling applications: Permanent stabilization of an active-landslide-slope M. Yamaguchi, Y. Kimura, T. Nozaki & M. Okada	457
Press-in technology: Advantage of Gyropress method for renovation of the third wharf of Dakar Port in Senegal Y. Ndoye, Y. Kitano & T. Funahara	467
Construction of retaining wall for river disaster restoration by Gyropress Method K. Matsuzawa, T. Hayashi & K. Shirasaki	474
Steel tubular piling by the Gyropress Method in proximity to obstructive existing H-shaped piles N. Yamazaki	482
Case study of oval shaped foundation using the Gyropress Method under overhead restrictions K. Takeda	489
Construction of anchor piles for mooring bank by Skip Lock Method Y. Tada, M. Kitamura, S. Kamimura & Y. Sawada	497
Press-in piling applications: Breast walls composed of steel tubular piles and combined wall M. Yamaguchi, Y. Kimura, H. Takahagi & M. Okada	505
Press-in piling applications: Seawall pile foundation work M. Yamaguchi, Y. Kimura, H. Takahagi & M. Okada	515
Upgrading earthen levees with press-in piling and the GRB System T. Takuma, S. Kambe & M. Nagano	524

Repair of flood-damaged New York subway station with pressed-in sheet piles T. Takuma, S. Nagarajan, M. Nagano & I. Vaz	530
Flood protection through dyke reinforcement at the river "Elbe" in Germany <i>F. Geppert</i>	535
Silent Piler in Bangkok MRT Orange Line Project P. Kitiyodom & I. Boonsiri	541
Session E: Miscellaneous	
Vertical and diagonal pull-out experiments of flip-type ground anchors embedded in dry sand in plane-strain condition S. Yoshida, X. Xiong, T. Matsumoto & M. Yoshida	549
Preliminary results of questionnaire survey on field performance of press-in machine T. Takeuchi, S. Sato, T. Takehira, M. Kitamura & H. Murashima	558
2D/3D FEM embedded beam models for soil-nail reinforced slope analysis <i>X.C. Lin</i>	566
Development of small-sized splice plates applied to steel sheet pile longitudinal joints <i>H. Nakayama & T. Momiyama</i>	574
Summary of case histories of retaining wall installed by rotary cutting press-in method N. Suzuki & Y. Kimura	581
A decade of R&D in press-in technology: Bridging the gap between academia-industry in Malaysia N.A. Yusoff, T.N. Tuan Chik, M.K Ghani & K.W. Chung	588
Author index	599