Comparison of Static and Dynamic Pile Load Tests at Thi Vai International Port in Viet Nam

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INTRODUCTION

The authors greatly appreciate the discussers for their valuable discussions to their paper. The authors' responses, which are possible at present stage, are summarised below.

PILE DIMENSIONS, HAMMER SELECTION AND DRIVING STRESSES

For dynamic load testing, the discussers infer that a FS of 2.0 to 2.5 would be acceptable such that the required mobilized resistance, without a SLT, would be about 8004 to 10005 kN. The factor of safety of 2 is prescribed in Vietnamese pile design standards code, TCVN 205-1998, for cases where SLT is carried out. The authors suppose that the discussers infer that maximum impact force in DLT needs to exceed 2 to 2.5 times the expected static pile capacity such that the static pile capacity is mobilized during DLT. The authors agree with the discussers' opinion.

The discussers indicate the key points to be considered in the hammer selection, e.g. drivability, testing requirements and potential for pile damage. The authors thank the discussers for providing the API, CFEM and in-house threshold criteria for the selection of an appropriate driving hammer with the comparison of the case of TSP1 (Figures 1 and 2 of Tara et al., 2014). The authors are also aware that a different driving hammer would have been used for initial pile driving (pile installation process) and for re-striking tests in the Thi Vai International port site. In reality, however, it was difficult to employ numerous driving hammer systems for practical reasons. Hence, the use of Delmag D100-13 might cause pile damage during the initial driving process, as the discussers pointed out. In Figure 30 of Phan et al. (2013), the calculated results of distributions of maximum compression and tension stresses along the pile shaft are discussed. Based on the calculations, the pile was not damaged during the initial pile driving process. In the calculation, it was ideally assumed that the pile was impacted without eccentric loading. It can be seen from the figure that the margin of the calculated maximum compression stresses to the allowable compression stress is not adequate. As pointed out by the discussers based on the Crapps, API and CFEM criteria, the pile, TSP1, might have been damaged during the initial driving process because the pile did not meet the requirements of the ratio (D/t) and the energy thresholds. It can be clearly seen from Figure 1 of Tara et al. (2014), that although some piles indicated by triangle symbol exceed the above mentioned criteria, the piles were not damaged. This means that pile damage could be caused by another reason. One of the possibilities is the eccentric loading during driving. As eccentric impact is inevitable in actual pile driving, the possibility of damage of TSP1 during pile driving is not completely contradicted. Since the authors are not allowed to access the raw data, definite conclusion cannot be made at present.

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