



Post – Installed Rebar Design

by Yeo Shih Horng

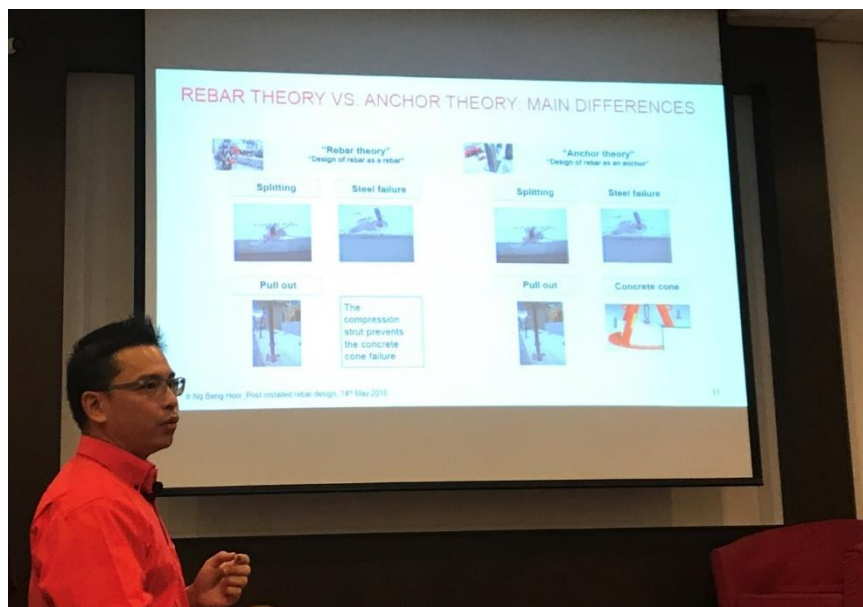
Yeo Shih Horng is currently a committee member in the Civil and Structural Engineering Technical Division (CSETD).

The “Post – Installed Rebar Design” was organised by the Civil & Structural Engineering Technical Division of The Institute Engineering of Malaysia on 14th May 2018. The technical talk was chaired by Ir. Yasotta Chetty and attended by 36 participants.

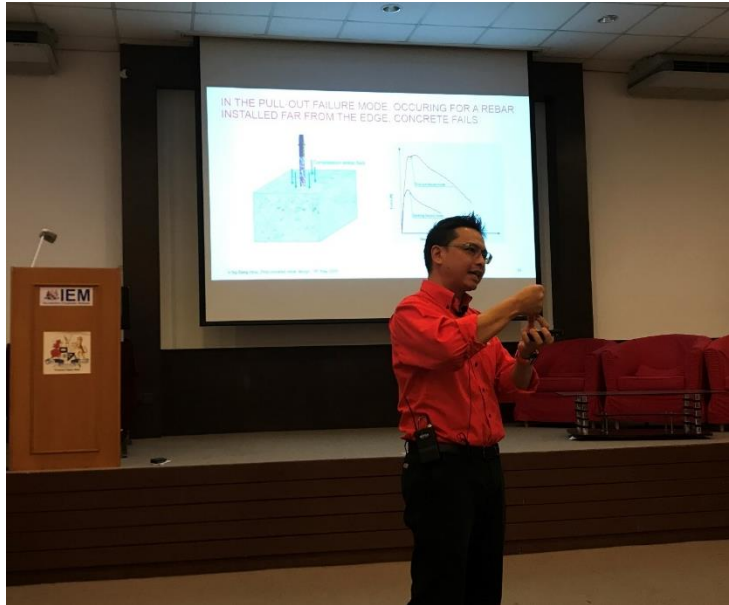
The talk was presented by Ir. Ng Beng Hooi. Ir. Ng was graduated from University of Technology Malaysia, Johor in 2005 with a B.Eng in Civil Engineering. He worked in consultants and suppliers for more than 12 years. He has been working in Hilti Malaysia since 2015 and has undergone basic and advanced training by Hilti in post-installed anchor and rebar design concepts.

Post-installed rebars can be applied for connections between original and new slabs, staircase connection, steel column encasement and column extension. For post-installed rebar, the design concept is based on rebar theory and the product must be fulfilled the requirement in EOTA TR-023.

Ir. Ng further discuss on the difference of failure mode between rebar and anchor theory which includes edge splitting, reinforcement failure and rebar pull out. Generally, pull out failure mode can only occur when a rebar is installed far from the edge.



Ir. Ng Beng Hooi explained the type of failure occur for rebar and anchor theory.



Ir. Ng Beng Hooi explained the rebar pull out failure mechanism.

For designing post-installed rebars, designer may refer to EC2 as a design guideline. The performance of post-installed rebars should be equivalent to those cast-in rebars. The bond strength of the post-installed rebar is calculated based on the formula below:

$$F_{bd} = f_{bd} \cdot \pi \cdot \phi \cdot l_{bd}$$

where

f_{bd} = based on the specific product

$$l_{bd} = a_1 a_2 a_3 a_4 a_5 l_{b,red}$$

$a_1 a_2 a_3 a_4 a_5$ = coefficients (Table 8.2 from EC2)

During design stage, engineers tend to make mistake, i.e., using a generic rebar design table to design all post-installed rebars applications. Some engineers overlook the bar spacing requirement and edge distance, failure to do that will cause the concrete edge to spall off. Another common mistake by engineers is using jobsite pull out test to verify the design which is not relevant. Pull out test on a single rebar does not reflect the spacing, edge effect, and long-term effect. The talk ended with questions and answers session from the floor. To appreciate the contribution of Ir. Ng Beng Hooi for sharing their knowledge in post- installed rebar design, Ir. Chong Chee Meng, the deputy chairman of Civil & Structural Engineering Technical Division presented a token of appreciation to the speaker.



Ir. Chong Chee Meng presented a token of appreciation to Ir. Ng Beng Hooi