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International
Journal
Of Modern Engineering Research (IJMER)

Study Of The Dimension Variation Of The Pheriperic Rib Of The Spider Web Structuring Against Displacement As A Road Pavement On Soft Soil.

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ABSTRACT: *The structure of the spider web is a modification of the spider's nest construction (KSLL) made by Ir. Ryantori and Ir. Soetjipto since 1976. This foundation consists of a combination of middle ribs (construction ribs) and peripheral ribs, concrete plates, filler soil and native soil around the construction of spider webs. In this study, peripheral rib variation will be carried out, with a uniform and centralized load to find out how displacement occurs. Thus numerical modeling is carried out using Plaxis 2D. The relationship between the maximum displacement graph and the thickness of the peripheral rib shows not too significant*
KEYWORDS: *Displacement, Shallow foundation, Spiderweb Structur, Plaxis 2D*

Date of Submission: 27-07-2018 Date of acceptance: 11-08-2018

I. INTRODUCTION

The structure of the spider web is a shallow foundation consisting of a combination of ribs and flat plates and soil improvement that fills the cavity between ribs (Fig. 1). Peripheric ribs are made longer than the middle ribs because of the function of the peripheric ribs to reduce the total reduction and maintain the stability of the possible slope, in addition as a protector for compressed fill soil from surrounding influences such as decreased groundwater flow and shrinkage (2). Some researchers have conducted research with this foundation, one of which is Darjanto [1] by looking at variations in depth and thickness of ribs. According to him, the addition of rib height does not show a significant increase in ultimate support strength. However, the addition of rib width indicates a significant increase in ultimate bearing capacity. From the results of these studies, it has not been specifically explained how the effect of soil displacement with the addition of width and height of these ribs.

To understand the effect of the rib-rib dimension, numerical modeling is carried out with various dimensions in the form of depth and thickness of ribs. In this article we will discuss the influence of dimensions on pheripheric rib.

II. PARAMETERS

This research is numerical modelling with the help of Plaxis 2D software. Modeling this the foundation structure of spider web is specified for road pavement. The following components required in modeling the structure of spider web are:

1. Soil

The modeling was done with soft soil assumptions with dry density (γ d) of 0.8 t / m3 and the ground was considered homogeneous. With the elastisity modulus (E) value referring to Table I.

.2. Load

Assuming the load received by the foundation of the spider web structure that is, the load is centered and the load is evenly distributed with different position, ie the load is centered in the center of the foundation (P1) and on the edge of the foundation (P2), the load is evenly distributed (qA) and the load is evenly half (q ½ A) of the road width, assuming road width of 7 m.

3. Rib

The rib consists of a middle rib (construction rib) and a peripheric rin. both have depth and thick elements (Fig. 2). in this case the middle rib (construction rib) is set with a depth of 100 cm and a thickness of 15 cm. Dimensions of peripheric rib varied with thickness of peripheric rib (tp) 10 cm - 20 cm and peripheric rib depth (Dp) 200 cm - 300 cm.

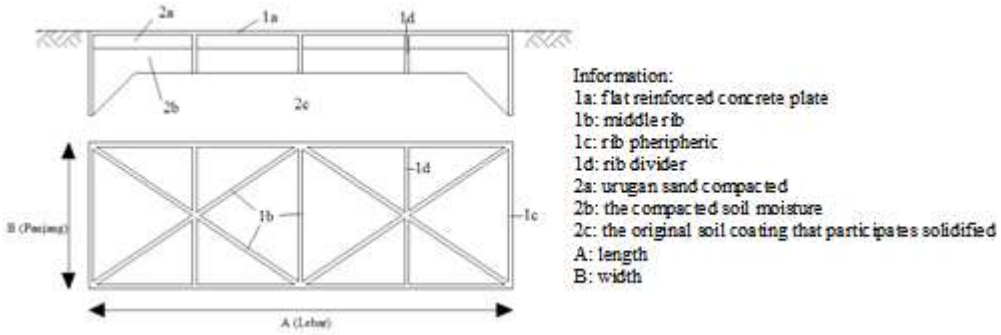

Fig. 1 Sketch pieces and spider web structure plan

Table I Value range for the static stress-strain modulus Es for selected soils, Bowles

SOIL	***ES*, MPA**
CLAY	
VERY SOFT	2 – 15
SOFT	5 – 25
MEDIUM	15 – 50
HARD	50 – 100
SANDY	25 – 250
GLACIAL TILL	
LOOSE	10 – 150
DENSE	150 – 720
VERY DENSE	500 – 1440
LOESS	15 – 60
SAND	
SILTY	5 – 20
LOOSE	10 – 25
DENSE	50 – 60
SAND AND GRAVEL	
LOOSE	50 – 150
DENSE	100 – 200
SHALE	150 – 5000
SILT	2 – 20

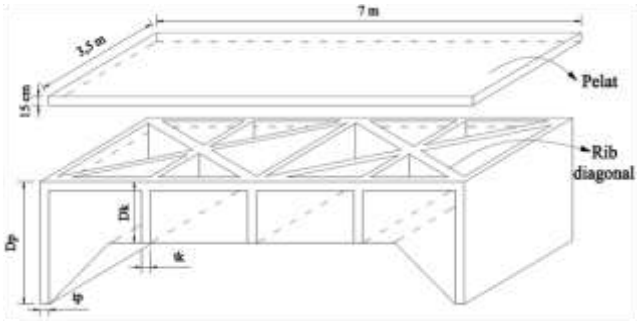

Fig. 2 Illustration of spider web foundation

III. RESULTS AND DISCUSSION

Model of spider web structure with Plaxis 2D is presented in Fig. 3. The results obtained from Plaxis 2D calculations can be seen in Fig. 4 through Fig. 7. Based on these Figures, it can be seen that overall for soft soil with dry density (γ_d) 0.8 t/m^3, the thickness of the edge rib (peripheric rib) does not have a significant impact. Only at the load at the edge of the foundation, it is seen that the thicker the rib edge the maximum displacement becomes smaller.

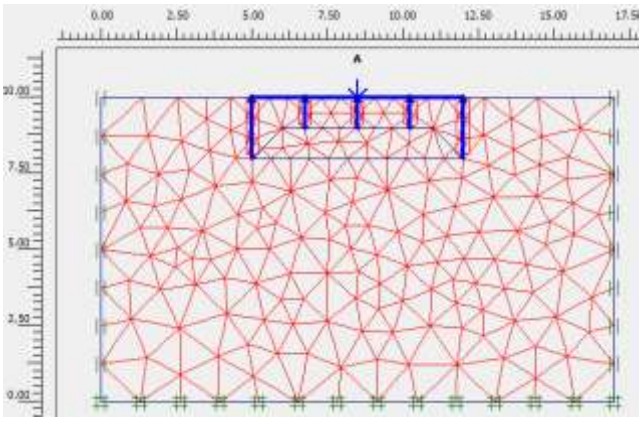

Fig. 3 Model on Plaxis 2D

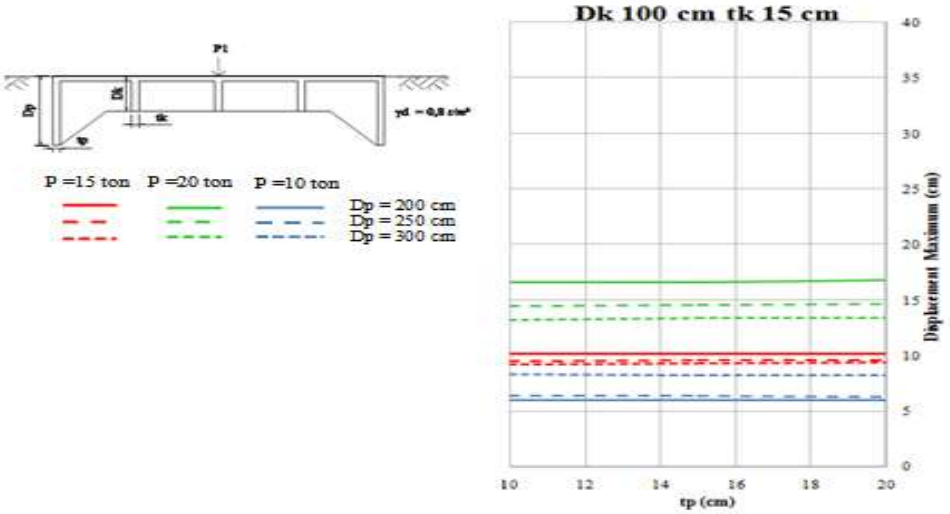

Fig. 4 Curve displacement versus thick pheriperic rib (tp) with central loading in the center of the foundation (P1) for dry density (γ_d) 0.8 t / m^3

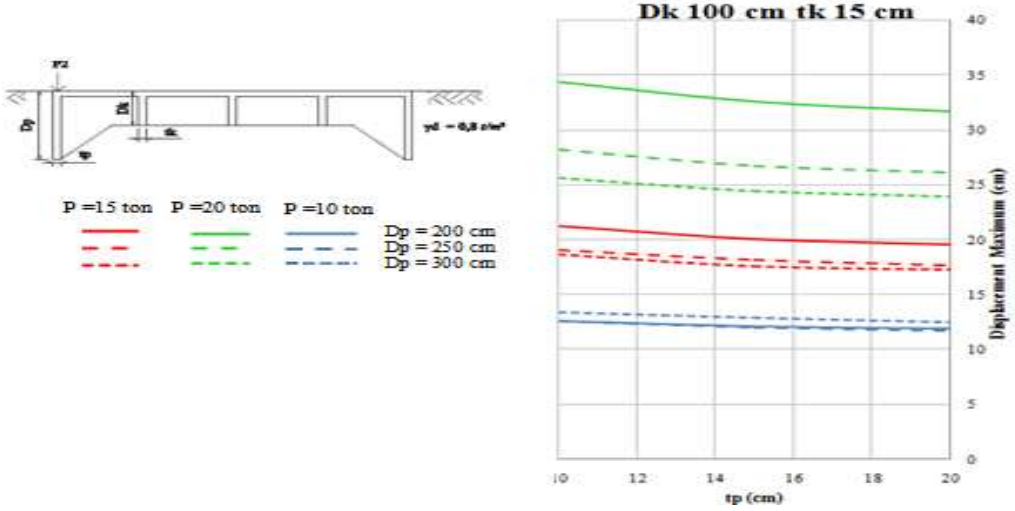

Fig. 5 Curve displacement versus thick pheriperic rib (tp) with concentrated loading on the edge of the foundation (P2) for dry density (γ_d) 0.8 t / m^3

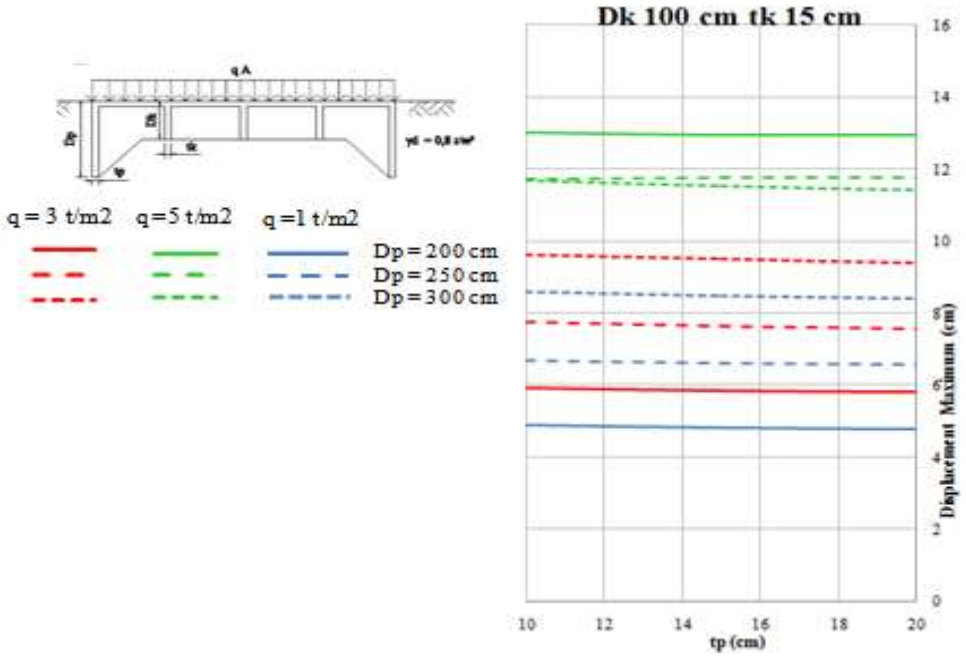

Fig. 6 Curve displacement versus thick pheriperic rib (tp) with full uniform loading (qA) for dry density (γ_d) 0.8 t / m^3

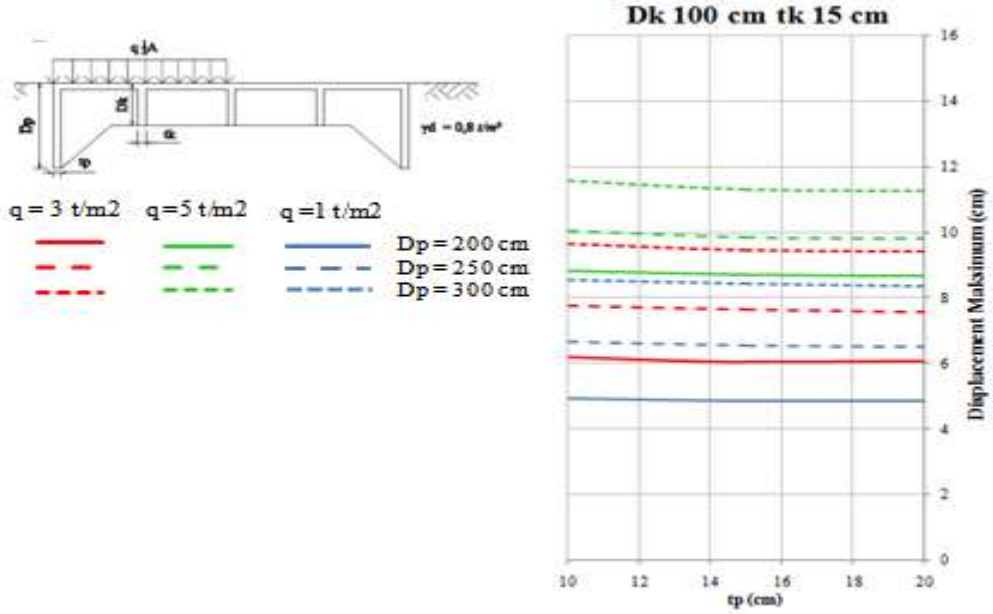

Fig. 7 curve displacement versus thick pheriperic rib (tp) with uniform loading of halfway width (q 1/2 A) for dry density (γ_d) 0.8 t / m^3

IV. CONCLUSION

Based on the above statements it can be concluded that rib pheriperic take effect on soft soil. The softer the soil then to minimize displacement the peripheric rib depth is increasingly extended during the conditions on the ground allowing for shallow foundation use.

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Hayatul Hamida1" Study Of The Dimension Variation Of The Pheriperic Rib Of The Spider Web Structuring Against Displacement As A Road Pavement On Soft Soil.. "International Journal Of Modern Engineering Research (IJMER), vol. 08, no. 07, 2018, pp.83-87.