This innovation is named “Non-Friction Rotating Device For Very Heavy Loads.”

Named Sosrobaiiu Technology

This is used for building an elevated toll road above the existing road which is already in full operation. The pierhead that supports the beams, which is 25 meters, is wider than the existing road, which is 19 meters. Using the conventional method of casting the pierhead across the existing road would hamper the traffic.

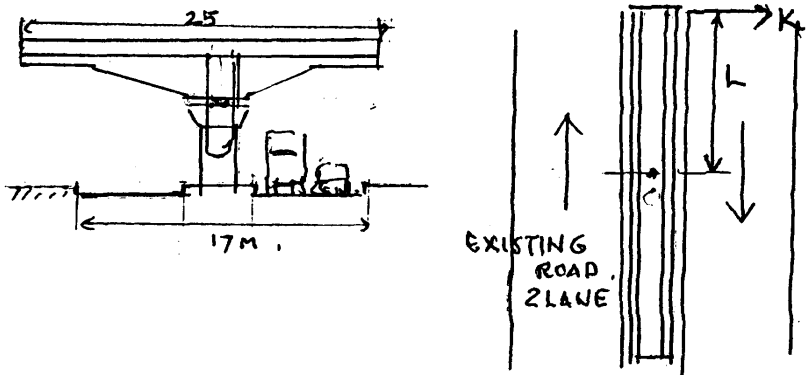
The pier is built in the median between the roads. Then the pierhead is cast parallel with the existing road and separated with the pier. The innovative equipment is put between the pier and the pierhead before the reinforcement and concrete of the pierhead are placed.

A U-shaped cable duct was placed in the pier through which the prestressing cable will be inserted later, after the concrete of the pierhead is strong enough to hold its own weight. Then the pierhead is turned by pulling with 800 kg forces until it is perpendicular to the axis of the existing road. The weight of the pierhead is about 450 tons. In Kuala Lumpur where we also used the same technology, the weight of the pierhead is 540 ton.

The innovative equipment is left there forever.

After grouting the space between the pier and pierhead, which is 2.50 cm, with grouting material for prestressing, the prestressing cable is then inserted through the cable duct. There are 4 cable ducts on each side. In every cable duct, 4 to 6 prestressing wires 0.5" thick are inserted and given a prestressing forces of 200 ton on each side. After that the duct is then grouted. The pierhead is then ready for supporting the beams.

During the construction of the pier, the traffic at the existing road was in full operation.



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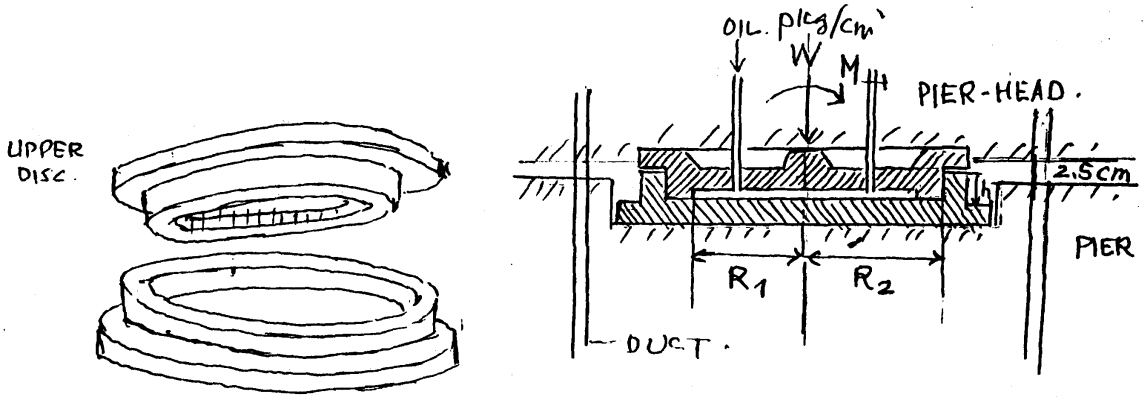
1. Illustration of the Equipment:



2. Sukawati Formula:

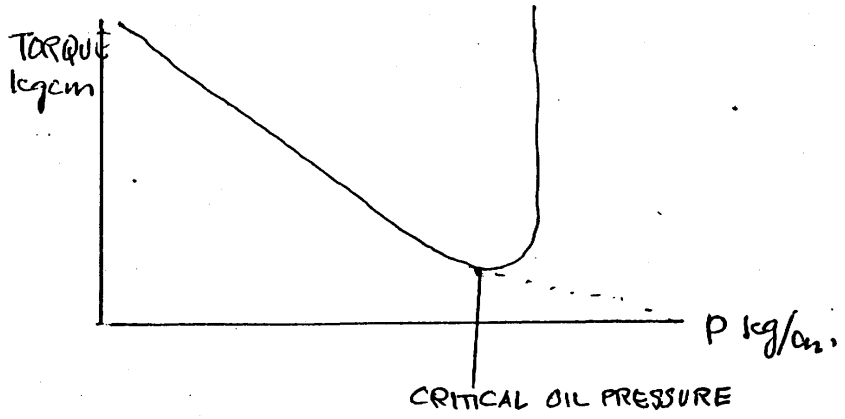
$$T_r = \mathrm{km}(W - P)\frac{2}{3}\frac{R_2^3 - R_1^3}{R_2^2 - R_1^2} + \frac{2M}{h}R_2$$

$$T_r = KL; \qquad P = 0.785\,pR_1^2$$

where M = moment in kg-cm; K = pulling force in kg; L = distance between the central point of rotation and pulling force K; p = kg / cm^2 (oil pressure).

Above the critical oil pressure the torque suddenly becomes so big that rotation becomes impossible. The critical oil pressure is different for every weight and oil that is used for the uplift inside the equipment.

3. Critical Oil Pressure:



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