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Concrete Bridge Design Prt 80m Span Tension (Case Study of Kali Warkapi Bridge Km 49+250 Manokwari-West Papua)

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Abstract
Kali warkapi bridge km 49+250 Manokwari, West papua which connects several districts in West papua province stretches 80m based because the bridge previously decreased until it is no longer feasible to use, the type of steel frame bridge structure, then in this final project the design for the replacement of kali warkapi bridge using prestressed concrete structure type at this initial stage the analysis of exsisting conditions, planning of upper and lower bridge structures and calculations is carried out. Superstructure planning takes into account the loadsthat may occur, namely self-load, additional dead load, traffic load, wind load and earthquakeload. In planning the bridge is calculated using Ms.Excel.

Keyword :
Bridge Structure, Prestressed Concrete, Superstructure Planning

1. Introduction
1.1. Research Background
To improve living standards and promote the economy needed transportation facilities and infrastructure are very important functions, both land and sea transportation, and air. One of the roles of means that can support is the bridge. Prestressed concrete bridges are increasingly being used, because these bridges provide ease of implementation and have a lighter weight than other concrete bridges. This is because the weight of prestressed steel is much smaller than the amount of weight of ordinary concrete iron, and cannot be separated from the success high quality concrete (c' ≥ 40 MPa) and high quality steel that has y ≥ 1000 MPa. it will dilakuakn loading analysis and modeling calculation of building structures on concrete bridges prtegang as well as the calculation manually or using Ms.Excel as well as structural analysis of buildings on prestressed concrete bridges.

1.2. Problem Formulation
Based on the background above the problems to be examined are:
1. How is the modeling and analysis of the calculation of building structures on prestressed concrete bridges with width, and safe and optimal bridge spans?
2. how modeling analysis and structural work on prestressed concrete bridge with variation, width, and bridge span using Excel)?

1.3. Literature Review
Prestressed bridge planning kali suru pemalang Santosa et al. (2015) Suru bridge is located in the village of Suru,

Bantar bolang, Pemalang linking local andregional Kesesi Bantar Bolang route its span 144 meters above the river suru. Suru bridge replacement is based on conditions that exceed the design life of the bridge, steel truss bridge already rusty and the effective width of the bridge that does not meet the standards to serve the transportation needs.

Planning girder cross section i30meter span prestressed concrete bridge Nasution et al. (2020) Prestressed concrete structures are one of the preferred methods in building bridges today. Hal it considers longer usability and less maintenance. therefore the calculation analysis of prestressed concrete bridge girders for various spans becomes much needed. Prestressed concrete bridge building standards Director General of Highways Department of Public Works in 1993 has set the cross section size based on the length of the girder from 22 to 40 meters with an interval of every 3 meters so that not the entire span is available cross-sectional dimensions of the interval. At this writing the calculation of the girder cross section with a span of 30 meters will be analyzed to calculate the cableand tendon placement.

Prestressed concrete bridge structural design Hidayat & Chayati (2014) The structure of the bridge consists of lower and upper buildings. Building under the bridge is very dependent on the state of the ground, so it takes a

soil investigation data that takes quite a long time and costs quite a lot. Given these reasons, the emphasis on the design of the structure of the bridge uses a lot of prestressed concrete structure system. In addition to the reason that the bridge spans tend to be long (30-90 m),

Redesigning Using Box Girder of the Upper Structure of Gajah Wong Bridge, Yogyakarta Hakim et al. (2013) The Gajah Wong bridge to be studied is located in road section of Selokan Mataram, connecting Gejayan Street and Seturan area, Sleman, Daerah Istimewa Yogyakarta Province. This bridge was built in order to increase economic and to support traffic activities in this area. Gajah Wong bridge has 40 m span. The designing of this bridge used I girder, and then would be done redesigning another form of prestressed-concrete bridge which is box girder. This redesign method being used is Bridge Management System (BMS).

Calculation of flyovers With box girder type prestressed concrete (prestressed concrete) to meet major alianyang road and soekarno-hatta road kubu raya regency (Prasetya et al., 2016). TProjection of traffic current is increasing of vehicle volume every year and for reducing conflict of perpendicular in junction of Jalan Mayor Alianyang and Jalan Sukarno-Hatta in Kubu Raya regency. Flyover become a alternative solution and a plan that can be a Bridge class 1 that has load of plan traffic current 100%from total load before. With width of highways 7,00 m (double ways) then must uses 2 unit box girder shaped trapesium with extend of bridge 60 m with spesification

: tall of girder 2,80 m, width of bridge 2 x 8,50 m, quality of prestressed concrete box girder K-500 (fc=41,50 MPa), and quality of plat concrete/slab of floor bridge K-500 (fc = 41,50MPa).

2. Research Method

The steps in the analysis of the structure of the bridge on this final project is done with several stages, such as the purpose of calculating the width, and the span of the bridge onthe structure of the bridge. The steps of planning the bridge structure can be seen in figure.

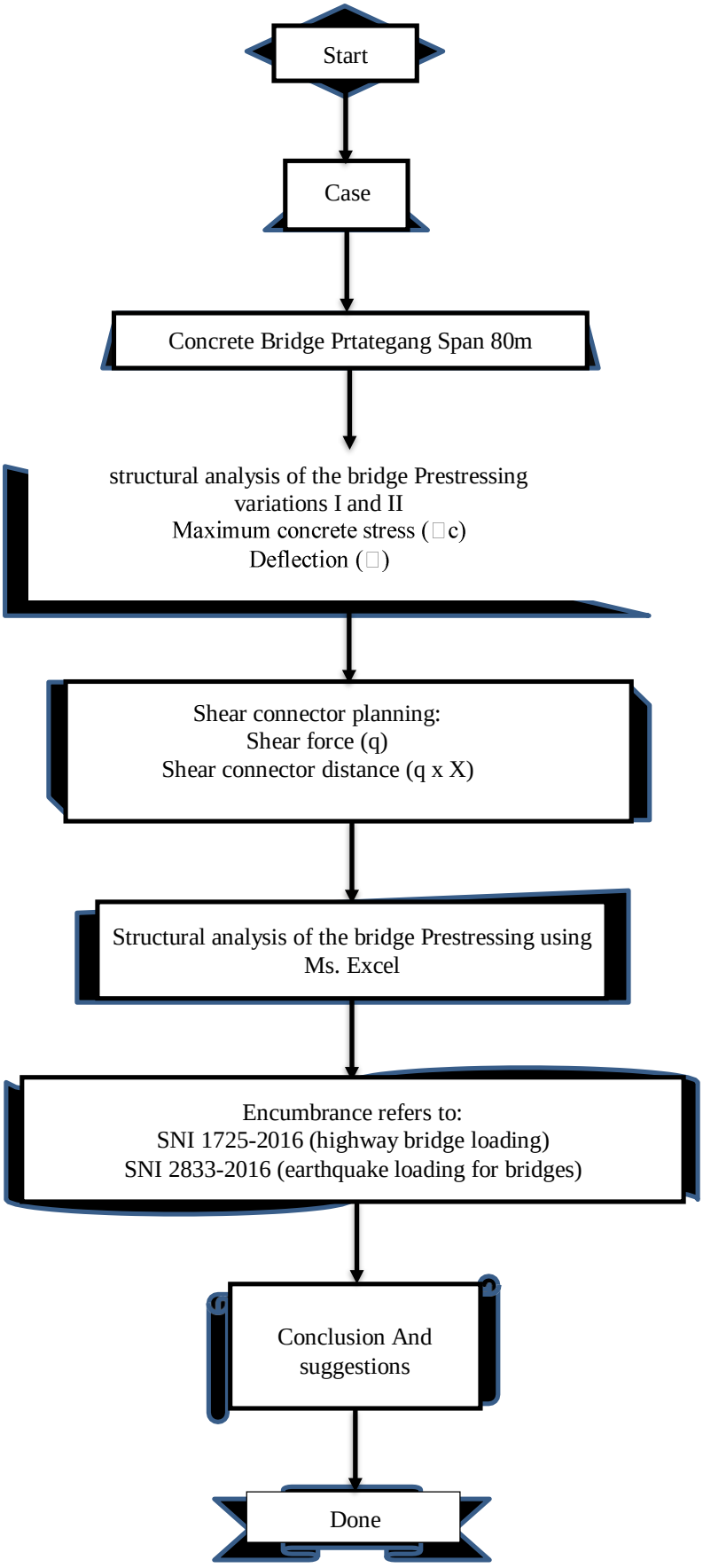

Figure 1. Research Methods

3. Result and Discussion

Table 1. Beam Moment Resume

Action / Load	Concrete Factor		Moment		Ultimate Moment	
	Ultimate		M	(kNm)	MU	(kNm)
A. Fixed action						
Own weight	K_{MS}	1,3	M_{MS}	24898,6	$K_{MS} * M_{MS}$	32368,18
Additional Dead Load	K_{MA}	2,0	M_{MA}	6683,2	$K_{MA} * M_{MA}$	13366,40
Shrink and crawl	K_{SR}	1,0	M_{SR}	3095,9	$K_{SR} * M_{SR}$	3095,86
B. Transient Action						
Column Load "D"	K_{TD}	2,0	M_{TD}	7094,4	$K_{TD} * M_{TD}$	14188,80
Brake Force	K_{TB}	2,0	M_{TB}	43,7	$K_{TB} * M_{TB}$	87,36
C. Environmental Action						
Influence of temperature	K_{ET}	1,2	M_{ET}	917,5	$K_{ET} * M_{ET}$	81857,13
Wind Load	K_{EW}	1,2	M_{EW}	65600,0	$K_{EW} * M_{EW}$	78720,00
Earthquake Load	K_{EQ}	1,0	M_{EQ}	81857,1	$K_{EQ} * M_{EQ}$	81857,13

The results of the above parameters get moments such as the table above.

4. Conclusion and Suggestions

From the analysis that has been done can be concluded that:

1. The prestressed bridge with a width of 1.20 m with a safe and optimal span of 80m has the following ultimate moments and moments: Fixed Action self weight moment is 24898.6 kNm and self weight ultimate moment is 32368.18 kNm, additional dead load moment is 6683.2 kNm and additional dead weight ultimate moment is 13366.40 kNm, shrinkage and creep moment is 3095.9 kNm and shrinkage and creep ultimate moment is 3095.86 kNm, prestressing moment is -15829.4 kNm and prestressing ultimate moment is -15829.42 knm, transient action “d” lane load moment is 7094.4 knm and “D” lane load ultimate moment is 14188.80 KNM, brake force moment is 43.7 knm and brake force ultimate moment is 87.36. Environmental action the moment of influence of temperature is 917.5 kNm and the ultimate moment of influence of temperature is 1101.03 kNm, the moment of wind load is 80960.0 and the ultimate moment of wind load is 97152.00 kNm, the moment of earthquake load is 81857.1 kNm and the ultimate moment of earthquake load is 81857.13kNm
2. Modeling analysis and pekrjaan building structure on prestressed concrete building bridges can mrnggunakan MsExcel, using a width of 1.20 m, and a length of 80 m mendaptkan final value of concrete moments prtegang and ultimate moment as well as the moment of his permission listed in Ms.Excel as mediation of prestressed concrete count.
3. the need for special details regarding bridge planning standards so that it has SNI in accordance with the circumstances and situation in Indonesia so that it does not need to use other country standards.
4. on the structure of prestressed concrete planning is still in need of a more thorough feasibility study and a complete reference.

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