

CHAPTER V CONCLUSIONS

The experimental study of six reinforced concrete beams that consist of three beams with uniaxial load and three beams with biaxial load were tested to study the effect of longitudinal steel reinforcement ratio on shear capacity and flexural capacity of reinforced concrete beams that rotated 45 degrees. The conclusions that can be taken from this research are:

- [1] The capacity of the beams that have been tested is generally increased according to the increase of longitudinal reinforcement ratio. For uniaxial loaded beams, BCR-02 to BCR-03 with 29.5% increasing of longitudinal reinforcement ratio, the capacity also increased by 15.5 %. For biaxial loaded beams, BR-01 to BR-02 with 34.3% increasing of longitudinal reinforcement ratio, the capacity also increased by 9%. BR-02 to BR-03 with 29.5% increasing of longitudinal reinforcement ratio, the capacity also increased by 11.3%.
- [2] The capacity of the beams is increased due to the different angle of loads. The biaxial loaded beams tend to have more capacity than the beams that carried out uniaxial load. Based on the research, the biaxial loaded beams have an average value of 20% higher capacity than uniaxial loaded beams.
- [3] The beams with higher longitudinal steel reinforcement ratio tend to be more brittle than the beams with smaller longitudinal steel reinforcement ratio.

- [4] The earliest flexural cracks for both uniaxial load and biaxial load scenario generally developed in the pure moment zone (between the two-point loads).
- [5] The length of flexural cracks varies based on the longitudinal reinforcement ratio, the smaller the ratio, the longer the crack occurs.
- [6] The theoretical flexural capacity tends to have a smaller value than the experimental results: this proves that the theoretical capacity calculation can be used to design a reinforced concrete beam cross-section.
- [7] The shear capacity from the experimental result is 15 to 90 % higher than the result from theoretical shear capacity that based on (Badan Standarisasi Nasional, 2013) both for uniaxial and biaxial (with two approaches from the proposed model by (Mark, 2007)).

