

## Chapter Six

### Conclusions and Recommendations

#### 5.1. Conclusions:

As a result from this investigation, the following conclusions can be drawn:

1. The superstructure for the case studied( *baseely* bridge ) was modeled according to the submitted details of concrete section and all dimensions were checked for consistency and were entered in the model .
2. SAP 2000 V14.2 software and manual calculation was used. British standard codes were adopted.
3. In this case study three position for HB vehicle have been experienced to obtain the worst case for bending moment and shear forces.
4. From manual calculation the maximum ultimate positive and negative moment for slab are equal (  $\pm 45.5 \text{ KN.m}$  ) , the maximum ultimate shear force due to equivalent wheel load equal (  $180 \text{ KN}$  ) .
5. The maximum ultimate moment for the beam element equal (  $3000.91 \text{ KN.m}$  ) which are obtained from case (HA+HB) position (1).
6. The maximum ultimate shear forces for beam are equal in all positions.
7. From computer analysis it is clear that HB vehicle is controlling the design of such bridge deck.
8. The torsional moment obtained from computer analysis results for the beam element are neglected, because they were very small values.
9. The Grillage analysis method is more expected and best to use when analyzing the bridge deck.

## 5.2. Recommendations:

The following recommendations can be made:

- 1- Create database for each bridges projects implemented in Sudan to facilitate the extension of scientific research for bridges.
- 2- Interest and expansion in the study of bridges engineering.
- 3- Must do field visits to sites of implementation and connect it to the academic side and the practical side.
- 4- According to B.S 5400 it is recommended to take the effect of temperature in consideration.
- 5- The use of advanced analytical and design programs that give results in high accuracy.
- 6- To avoid longitudinal cracks on the soffits of the girders due to loadings and dense tension reinforcements, transverse diaphragm at the mid span of girders must be used.
- 7- Using software program in the studies beside the other ways.

## 5.3. Suggestion for future Researches:

Future bridges structural studies could cover the following:

- a. Steel plate girder bridges by using the grillage method based program.
- b. Analysis and design of bridge sub-structures such as abutments, piers, wing wall and piles.