

## **CHAPTER V**

### **CONCLUSION AND RECOMENDATIONS**

#### **5.1 Conclusion**

1. The flow pattern formed in each type is a turbulent flow, with similar movement characteristics—initially entering from the inlet in a streamlined manner, but transitioning into turbulence when the fluid hits the elbow. It is linear to the velocity of fluid where the fluid velocity increases when it strikes the elbow.
2. the internal flow of fluid due to the expansion loop geometry caused variation type of velocity and turbulence kinetic energy on the pipeline but in this case stress and deformation inside the pipeline was only impacted by the thermal expansion and position of support. the internal fluid just only impacted to the pipeline for high pressure reason.
3. the position of the loop was impacted to the stress and deformation of the pipeline where the expansion loop that placed in the middle of the pipeline system was having a good distribution of stress and deformation were giving the best flexibility. Stress and deformation both 1/3 inlet and 1/3 outlet position of the loop were concentrated in one of edge side of the loop with a higher maximum stress and deformation.

#### **5.2 Recommendations**

1. a higher specification device will be highly recommended for getting a better accuracy of simulation.
2. Further research is needed on the sources that may increase or decrease the magnitude of stress in the pipe during operation.