

CHAPTER 5

RESULTS AND DISCUSSION

5.1 RESULTS

Bayesian Network is applied to the following equipment and components. The site specific local failure data are computed based on available data obtained from the field maintenance department databases and the failure cases are calculated. But at the same time the observable period has a significant difference in the field. However, these values are computed according to the generic or historical database values and computed according to the requirement of Bayes theorem.

Individual components and parts of the system are enclosed in **Appendix 9** for natural gas gathering station. The flange joint, road tanker transportation and pressure relief valve are other flammable gas facility for which failures are estimated based on Bayesian network method. The generic and posterior frequency data are plotted as shown in graphs in Figures 5.1, 5.2, 5.3, 5.4, and 5.5.

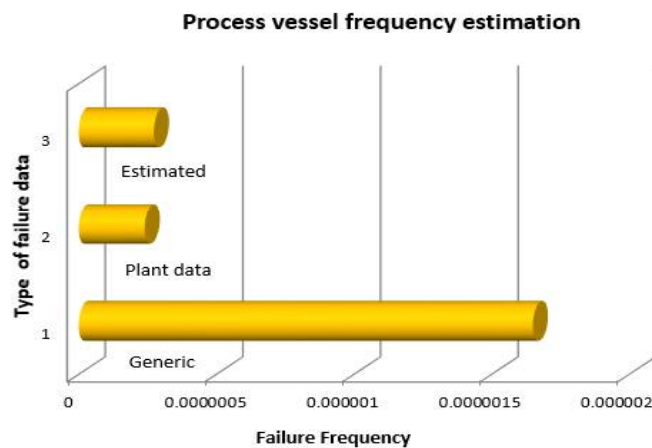


Figure 5.1 Process vessel frequency comparison

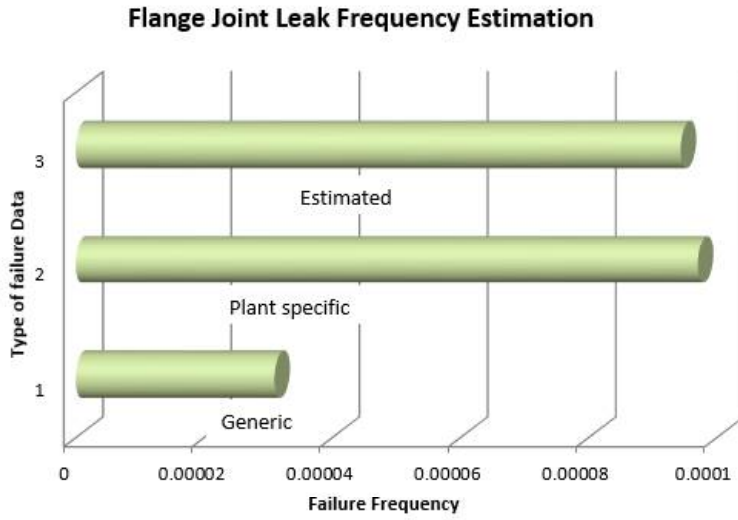


Figure 5.2 Flange Joint frequency comparison

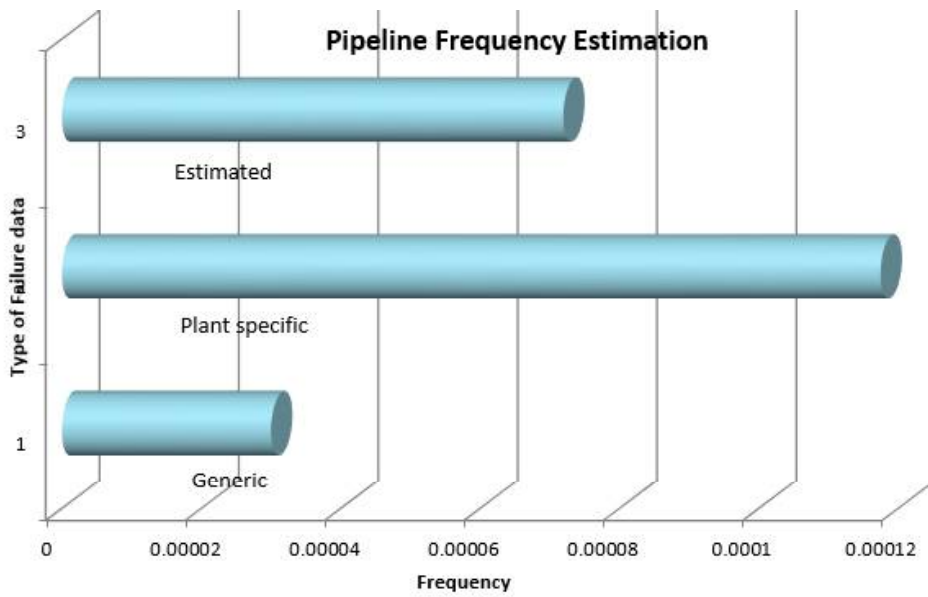


Figure 5.3 Pipeline frequency comparison

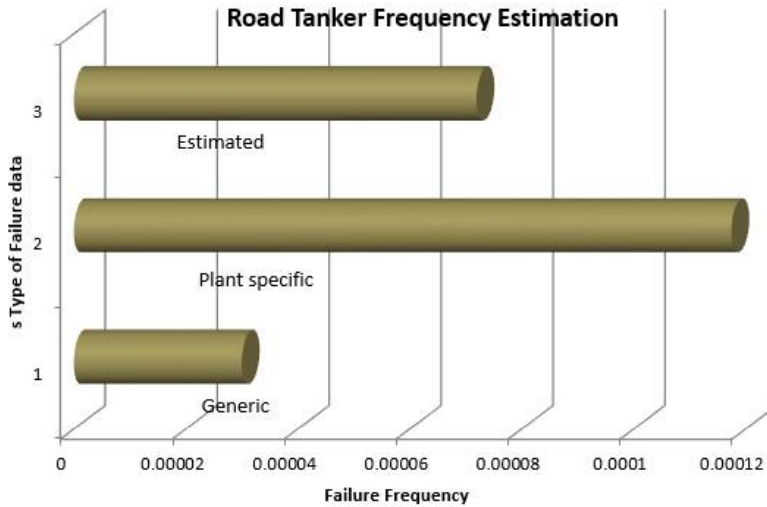


Figure 5.4 Road tanker frequency comparison

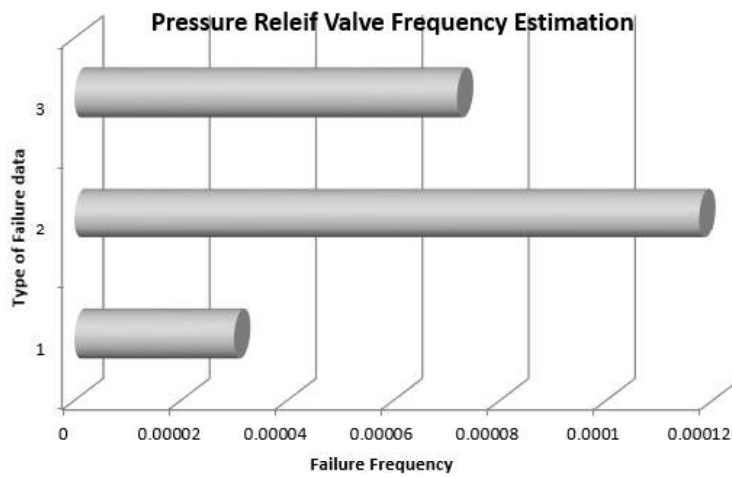


Figure 5.5 Pressure Relief valve frequency comparison

Estimated values have significant influence with site specific failure data. Figure 5.6 shows the comparison of the components which influence initiating frequencies.

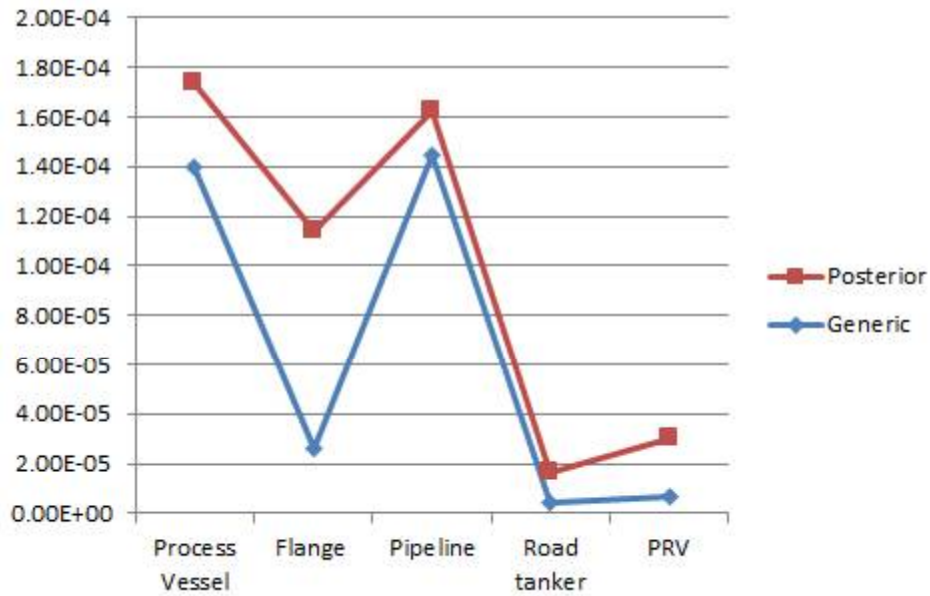


Figure 5.6: Generic frequency comparison with posterior frequency

Flange joints have a very significant influence as the field specific data frequency as well as the frequency mentioned in databases have a marginal difference. Table 5.1 shows the five component generic and posterior frequencies.

Table 5.1: Generic frequency comparison with posterior frequency

Components / Event Frequency	Process Vessel	Flange	Pipeline	Road tanker	PRV
Generic	1.40E-04	2.57E-05	1.45E-04	4.30E-06	6.79E-06
Posterior	3.34E-05	8.85E-05	1.73E-05	1.21E-05	2.32E-05

5.2 DISCUSSION

Generic/Historic database assessments produce conservative results if they are used directly in an analysis. Synthesized failure frequency data with facility/plant conditions improve the overall frequency assessment and thus

influences the risk level. The **Figure 5.7** shows the frequency estimation based on parts count approach method using generic frequency as well as Bayesian updated frequency. The results shows clearly few components have significant influence on frequency variation. This is due to the filed specific data failure rate influence and the number of components used in the facility.

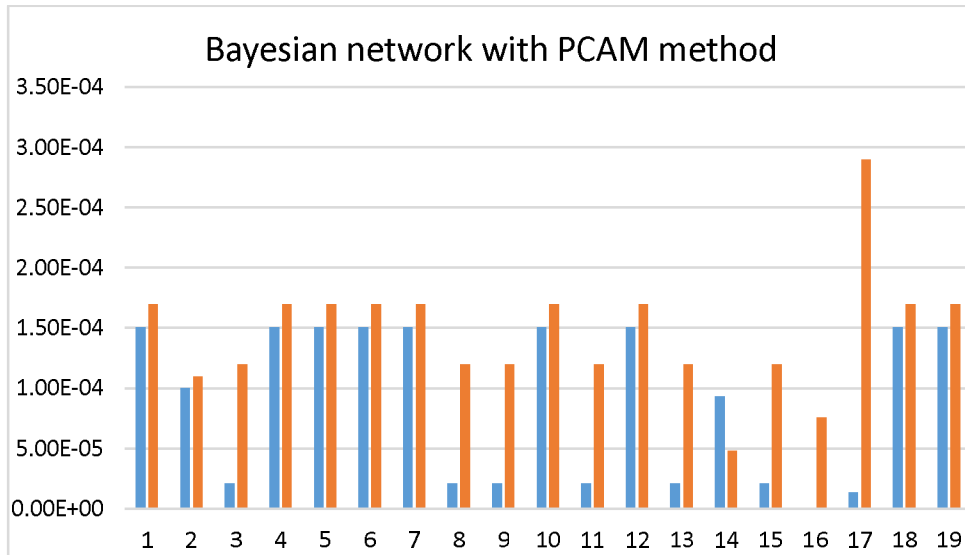


Figure 5.7 Frequency comparison of NG gathering station and its components.