

## Reliability Analysis of a Life Support System in a Public Aquarium

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**Abstract :** Complex Life Support Systems (LSS) are used in all large commercial and public aquariums in order to keep the fish alive. Reliabilities of individual equipment, as well as the complete system, are extremely important and critical since the life and safety of important fish depend on these life support systems. Failure of some critical device or equipment, which do not have redundancy, results in negative consequences and affects life support as a whole. In this paper, we have considered a life support system in a large public aquarium in Kuwait Scientific Center and presented a procedure and analysis to show how the reliability of such systems can be estimated by using appropriate tools and collected data. We have also proposed possible improvements for systems reliability. In particular, addition of parallel components and spare parts are considered and the numbers of spare parts needed for each component to achieve a required reliability during specified lead time are calculated. The results show that significant improvements in system reliability can be achieved by operating some LSS components in parallel and having certain numbers of spares available in the spare parts inventories. The procedures and the results presented in this paper are expected to be useful for aquarium engineers and maintenance managers dealing with LSS.

**Keywords :** life support systems, aquariums, reliability, failures, availability, spare parts

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