

12 Key Questions on PAM

Introduction

This document provides answers to 12 key questions on **PAM**.

Q1. What are PAM's input data?

All relevant data are considered as possible predictors in the asset survival models but only statistically significant predictors are included in the models. Possible predictors include the asset register, the assets' maintenance and failure histories, location data and weather data. PAM Analytics recognises that the actual data available varies between organisations.

Q2. How are PAM's outputs accessed?

The output from each **PAM** output module is accessed using the module's visualisation component. The databases behind the visualisations can be exported for use in other applications.

Q3: How is PAM implemented?

PAM is implemented as SaaS (Software as a Service).

Q4: Does PAM establish which factors contribute to asset failure?

Since the asset survival models in **PAM** are predictive, **PAM** establishes the factors that contribute to asset failure.

Q5: How does PAM optimise the asset management policy

PAM optimises the asset management policy at individual asset level, and at the operational, tactical and strategic levels.

Q6. Can users define their own asset groups?

Users define their own asset groups, for example all pumps in waste water pumping stations. An asset survival model for each asset group is developed in the Asset Survival Models module and then used in the Predicted Maintenance Interventions and Asset Survival Simulations modules. **PAM** does not have a limit on the number of asset groups.

Q7. How frequently are the models run and refreshed?

PAM must be run regularly to ensure that the most recent maintenance and failure data are used in the models and therefore reflected in the outputs. Before the models are run using new data, the Time to

Failure Transformations module must be run on all the data. After the models have been used for some time, they should be refreshed by updating them with the most recent data (and older data).

The rerun and refresh frequencies are discussed and agreed with the client.

Q8. How does PAM monitor the effects of past and future asset maintenance?

The Predicted Maintenance Interventions module calculates each asset's survival probability at each past time as a function of its maintenance and failure history, and other data. The Asset Survival Simulations module simulates the effects of future maintenance interventions on the assets' survival probabilities. Time series plots of each asset's survival probabilities and cumulative hazards (accumulated risks of failure) show how they change over time and as they have maintenance interventions.

Q9. How does PAM consider asset criticality and asset cost?

Asset criticality and asset cost are weights that are applied to the asset survival probabilities (the output of the Asset Survival Models module). Thus, **PAM** has three measures of the risk of failure for each asset: the probability of failure; the probability of failure adjusted by the asset's criticality; and the probability of failure adjusted by all the costs resulting from the asset's failure.

Q10. How does PAM calculate the deterioration curve for each asset?

PAM calculates the (instantaneous) failure rate for each asset at each time from the asset's survival model. The deterioration curve for an asset is a graph of its failure rate against time.

Q11. How does PAM calculate the expected time to the next failure for each asset?

PAM calculates the expected time to an asset's next failure by applying a threshold survival probability to the asset's projected survival probability profile. The expected time to the failure is the time until the projected survival probability reaches the threshold survival probability.

Q12. How does PAM model asset redundancy when standby assets are present?

PAM models asset redundancy when standby assets are present by using the redundancy specification to combine the survival probabilities of the assets in the group. For example, if three assets are available and only two assets are required at all times, **PAM** calculates the probability of at least two assets being available at all times.