

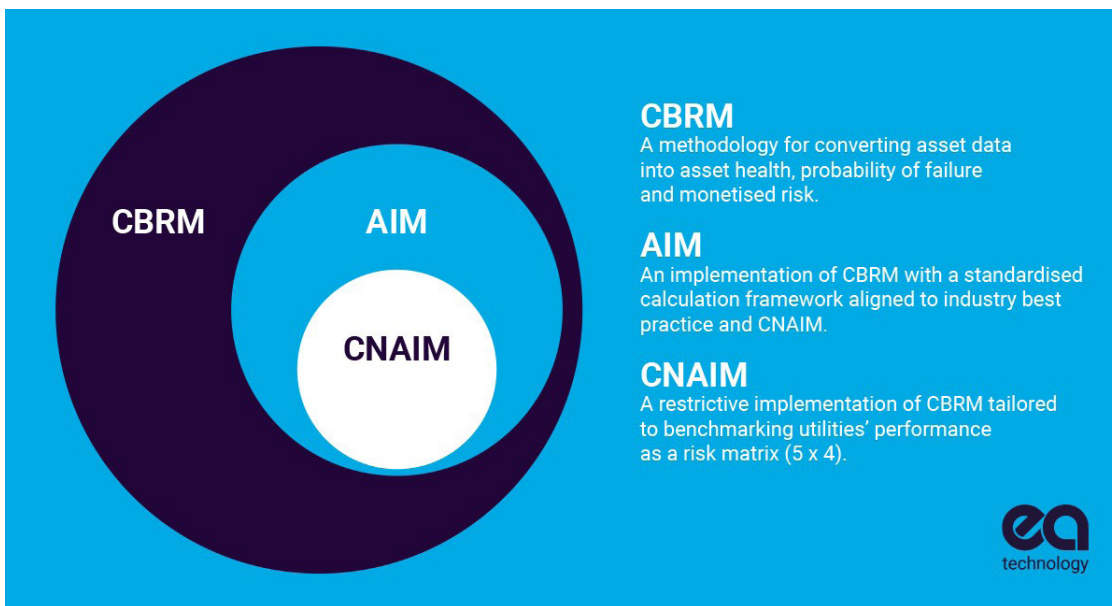


CNAIM vs AIM vs CBRM: What's the difference?

Martin Hunt, EA Technology Australia

Background

This article explains three related but different terms that are relevant to electrical asset health, performance and risk.



CBRM

Condition-Based Risk Management (CBRM) is a methodology which allows asset managers to move away from age-based (traditional) replacement decisions and use monetised risk instead to prioritise replacement of assets. Failure curves are traditionally based on the age of an asset. CBRM replaces age with an asset health index (AHI). The AHI represents the condition of the asset and allows calculation of an individual probability of failure for each asset in the population. Monetised consequences of failure can then be multiplied by the probability of failure to determine the risk associated with each individual asset and then summed to determine network-wide risk.

CBRM allows asset owners and operators to understand the health of their assets and compare risk across asset classes. Asset managers can compare hundreds or thousands of assets in this way to optimise replacement planning and to consider all assets equally. By projecting results into the future, the asset manager can understand the impact of increasing or decreasing replacement expenditure over time and optimise their spend profile through time. CBRM analysis can also identify assets which may have individually-high safety, environmental or financial risks.

Each CBRM model is bespoke and tailor-made to the organisation's requirements. Subtle variances in the way calculations are configured can lead to greater accuracy in individual AHI and risk results. However, these differences may detract from the ability to benchmark against other assets which have been modelled differently.

AIM

Asset Investment Management (AIM) is a software solution provided by EA Technology which implements a standardised, industry best-practice version of CBRM, closely aligned with the Common Network Asset Indices Methodology (CNAIM). The number of data points used, the way each calculation is performed and the nomenclature all aligns with CNAIM. The differences are calibration, specific data fields used and monetised risk as an output in addition to the risk matrix. AIM allows users to model their assets based on available data and incorporate their expert knowledge into the model via the calibration process. This enables accurate risk results to be delivered quickly, whilst maintaining close alignment with the most widely accepted industry best practice standards for condition-based risk management.

AIM models deliver a predictive assessment of the future health and risk of failure. Using AIM models, it's possible to simulate different asset investment plans and assess the benefits of these on the network. AIM also comes with a range of advanced features and modelling tools which allow users to assess the benefits of asset management strategies other than replacement. New user dashboards allow organisation-wide dissemination of the results, freeing up asset managers from answering questions from other planners and managers about their assets.

CNAIM

Common Network Asset Indices Methodology (CNAIM) is a framework agreed by the distribution network operators and the regulator in Great Britain (OFGEM) for benchmarking each electrical utility against the broader industry, applying for regulatory funding for replacement capital expenditure and for ongoing reporting of progress to target during the regulatory period. CNAIM is prescriptive and mandates the use of a certain set of data points for each calculation, the calibration values to be used and the way each calculation is to be performed. Users cannot adjust the inputs of the models or tweak the outputs to align with their own knowledge and experience. This approach lends itself to benchmarking and reporting, but produces less accurate results for internal planning and reporting activities than either AIM or bespoke CBRM models do.

The main benefit of CNAIM is the fact that it is the industry standard. A working group comprised of representatives of every network operator in Great Britain and the creators of CBRM (EA Technology) consulted over two years to define the agreed methodology. CNAIM has become the starting point for development of new AIM and CBRM models and, as it's open source, is being offered by third-party software vendors as a bolt-on to their apps. CNAIM can offer valuable insights into the health of, performance of and risk associated with your assets, but should always be the starting point on your condition-based risk management journey and not the final destination.

Term	CBRM	AIM	CNAIM
Stands for	Condition-Based Risk Management	Asset Investment Management	Common Network Asset Indices Methodology
Relationship	The overarching methodology	A subset of CBRM, closely aligned to CNAIM	A subset of AIM
Data	Uses available relevant user data to calculate asset health, probability of failure and monetised risk.	Use the same number of data points as CNAIM but maps available user data to them.	Fixed data fields
Recommended usage	Bespoke asset health and risk modelling.	All asset management requirements.	Benchmarking and preliminary health and risk assessment.
Questions it answers	<p>How much can we reduce expenditure without impacting future performance?</p> <p>Which assets do we urgently need to get off the system?</p> <p>Is the asset investment plan delivering the expected benefits?</p> <p>Where are there significant safety risks on our network?</p>	<p>Same as CBRM and CNAIM, plus:</p> <p>What smart interventions could we undertake that would have a positive net present value and avoid early asset retirement?</p> <p>What does my asset health and risk profile look like over the next 25 years for the "do nothing", percentage replacement and targeted interventions scenarios?</p>	<p>How do we compare to other utilities using CNAIM?</p> <p>What should our asset replacement budget be over the next 8 years?</p> <p>Are we reducing our network risk year-on-year as we deliver our replacement program of works?</p>