



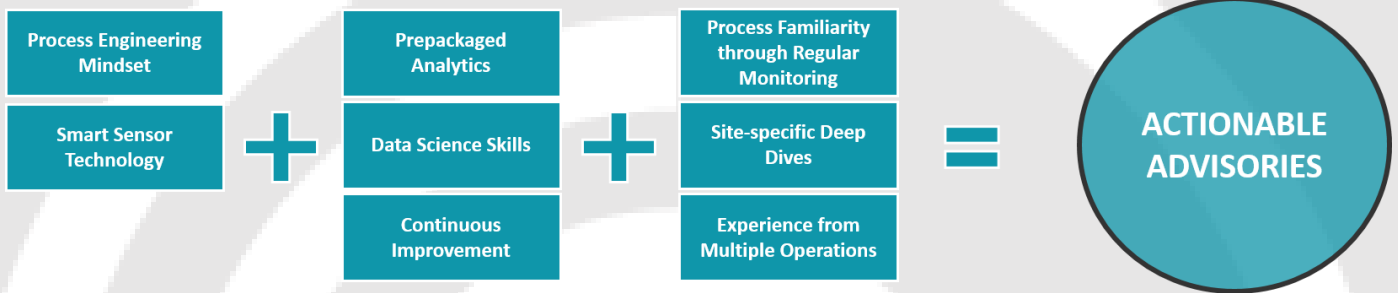
StoneThree
The Future of Work. Now.

Process Monitoring & Diagnostics

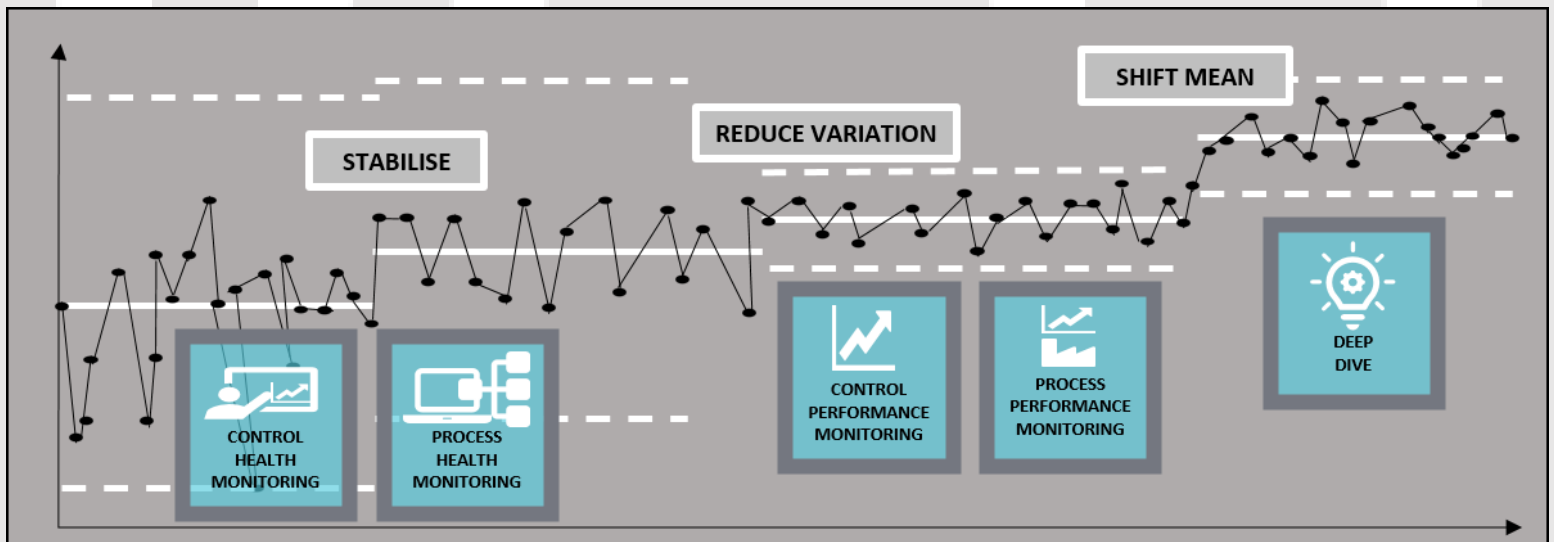
Actionable Advisories for Improved Process Performance

Remote Process Monitoring and Diagnostics as a Service

Stone Three offers remote process monitoring and diagnostics (RM&D) services to industrial processing customers. The purpose of the remote process monitoring and diagnostics service is to generate actionable advisories as decision support to site stakeholders to enable improved process performance. The Stone Three RM&D team complements and augments customer know-how by means of smart sensors, smart people, smart processes, and smart technology. The RM&D service takes site data, context and knowledge as input and generates actionable advisories through packaged data analytics, scheduled checks, and diagnostics of key performance indicators by our process engineers, as well as deep dive investigations on critical process challenges.



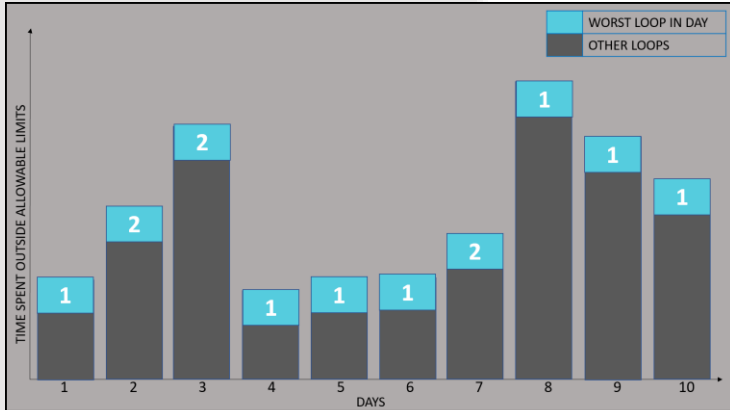
Our RM&D team's engineering domain knowledge as well as data analytics training and experience, ensures that we can tackle big process data problems while never losing sight of the process fundamentals. Prepackaged process data analytics together with continuous improvement of our offering ensures that we have plug-and-play monitoring and diagnostics capability as well as flexibility to customer's unique needs. Stone Three RM&D services aim to build successful long-lasting partnerships with our customers, where in process familiarity built up through regular monitoring as well as experience from multiple operations ensure continuous value-add.



Benefits of Stone Three Process Monitoring & Diagnostics

- Increased Throughput
- Increased Recovery
- Lost Production Prevention
- Improved Workforce Productivity
- Improved Operational Efficiency

Where available to our customers, our smart sensors put us in a unique position to leverage critical process measurements (e.g. particle size analysis, froth and pulp properties, conveyor belt condition) for maximum site productivity. The different themes of our RM&D service aims to ensure that the process plant improves from unstable to stable operation (through control and process health monitoring), and that the process plant improves from stable sub-optimal operation to stable optimal operation (control and process performance optimisation as well as deep dives).

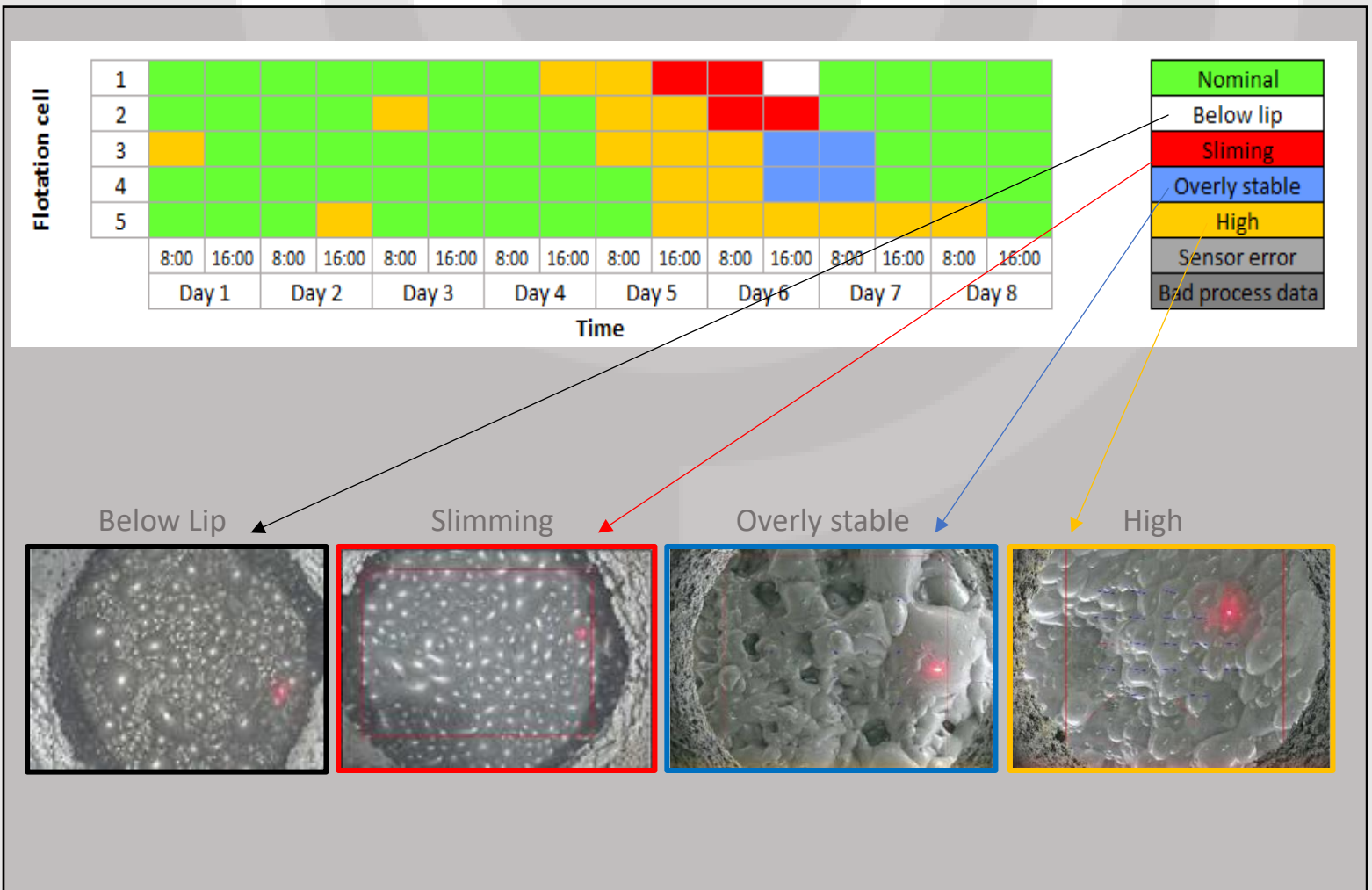


Control Health Monitoring

For an industrial site to make the most of automation infrastructure, it is essential to regularly monitor the health of process control systems in order to identify and prioritize necessary interventions for continued control functionality and stability. The Stone Three control health monitoring offering includes packaged analytics and scheduled checks which describe the state of control health in a defined period, diagnose the worst performing control loops including potential root causes (e.g. valve saturation, faulty sensors), predict the consequences of no interventions, and prescribes appropriate interventions to improve control health (e.g. instrumentation maintenance).

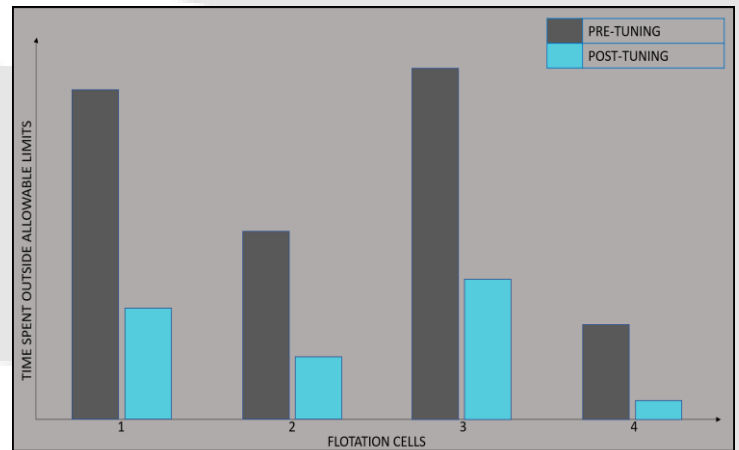
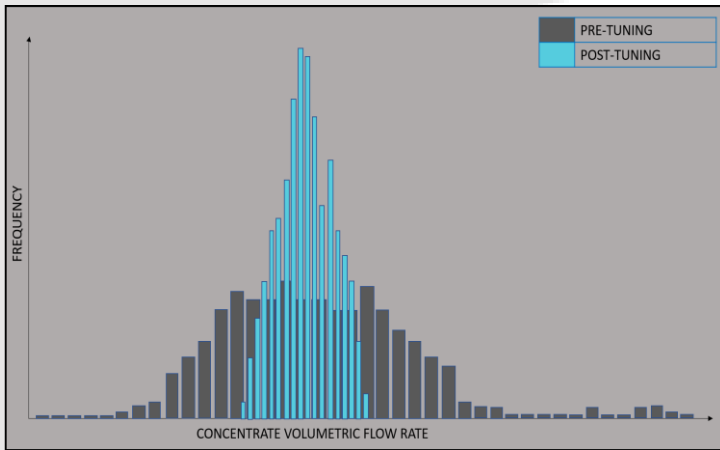
Process Health Monitoring

Specific process units and process sections have specific key performance indicators and operational purposes, which need to be consistently met to ensure overall stable process plant productivity. Stone Three offers process health monitoring services, which include packaged analytics, scheduled checks, and automated notifications to describe and diagnose different process health states, as well as to diagnose undesired process health states, augmented with prescriptive actionable advisories. An example of process health monitoring is the Stone Three froth states solution: automated notifications and period summaries of healthy and unhealthy flotation process states (e.g. below lip, sliming, overly stable, high) are generated, allowing the identification and diagnosis of persistent and propagating unhealthy process states.



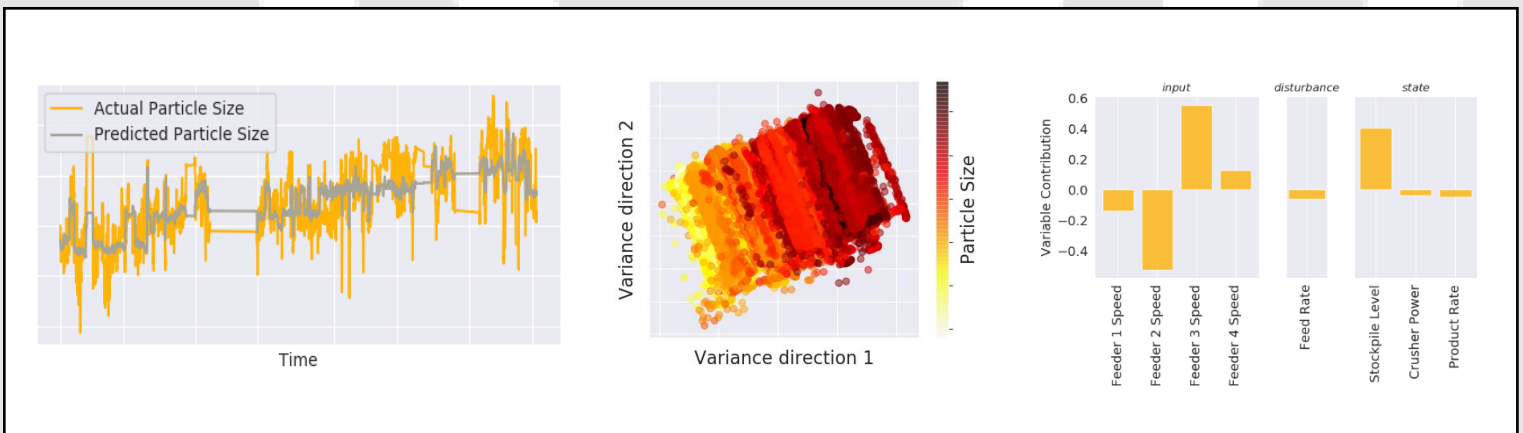
Control Performance Monitoring

Once overall control health is secured and stabilised in an industrial process, control set points can be optimised to improve process productivity. The Stone Three control performance optimisation offering includes packaged analytics, scheduled checks and deep dives which aim to discover opportunities for improved control performance through remote tuning of regulatory controllers, optimisation of control set points in the presence of measured disturbances, and more.



Process Performance Monitoring

From a foundation of stable process health, opportunities for improved process productivity can be explored. Through scheduled checks, packaged analytics, and deep dives, Stone Three delivers a process performance optimisation service. Through in-depth process analysis that makes use of process knowledge, process models, site context, and multivariate data analytics, historical process data is analysed to identify operational states representing periods of different process performance, as well as the controllable and uncontrollable process drivers that lead to these states. Recommendations can then be made to improve process performance.



Process Deep Dives

Part of the Stone Three remote process monitoring and diagnosis service is process deep dives. These deep dives are specific and customised by process data scientists and subject matter experts into critical issues identified through monitoring scheduled checks and/or site requests that require more in-depth analysis. Deep dives follow the cross-industry process for data mining (CRISP-DM) to ensure objective, structured, and value-focused investigations. Deep dive investigations as part of the suite of Stone Three remote process monitoring and diagnosis services are very effective, typically with actionable advisories possible within two weeks.