

Profile Grade Performance Optimization

Diagnose issues and quantify the financial benefit of improved profile steady state and recovery performance

Typical grade issues

- Non-uniform reel building causes issues on re-winder and in converting
- Profile off spec time is too long during grade change and sheet break recovery
- Actuator to profile mapping is misaligned for some grades or operating conditions
- Actuator changes are excessive relative to profile variation
- Ability of current actuators to reduce profile variation is not clearly understood

Solutions to optimize profile recovery

ABB Profile Grade Performance Optimization follows a proven three-step methodology to Diagnose, Implement and Sustain improved profiling. The Diagnose step establishes a benchmark for optimal performance and a basis for evaluating and identifying improvement opportunities unique to your process.

Since profiles are affected by an array of process and system influences, machines that run diverse grade groups and average one to two grade changes every two to three days will benefit from ABB Profile Grade Performance Optimization services.

Optimization typically uncovers between \$100,000 to \$400,000 in annual savings per CD control application.

Diagnose

The diagnostic step includes a series of machine audits to answer questions such as the following:

- Are there controllable variations present in the profiles?
- Is there grade dependency in the profile response and actuator-to-profile map alignment?
- Is the actuator-to-profile map linear?
- Can profile recovery performance be improved?

The diagnostic step can be used as a standard to compare machine performance from year to year. An included improvement plan provides detailed ROI based solutions designed to insure improved process quality and production. Typically, mills that implement improvement recommendations



have benefited with a six month or better payback, and each dollar spent is returned 10 times over in added ROI to the plant.

Key performance indicators

The following performance indicators become the benchmarks that can be used to show how the CD control and profile process is performing presently and over time.

- **Profiling capability:** Not all variations in the profile are controllable by a CD control system. From process data, system setup, profiler type and bump test response, the steady-state profile can be decomposed into controllable and uncontrollable wave forms to assess improvement potential in the remaining profile variation.
- **Sheet width stability:** Without proper mapping, the CD control can quickly deteriorate. The first step in getting optimum mapping is to evaluate how accurately the sheet edges are measured, maintained, and how much variation exists in the sheet trim. These assessments determine the accuracy of the global control mapping.
- **Mapping variability:** Once global mapping is evaluated, bump test data is used to evaluate finer details to produce a mapping index. The mapping index shows variability among select product grades and within each product grade on different production dates. The most fit map is compared against the current control map to determine global and local shrinkage to assess whether a static or dynamic control map is needed for the CD control application.
- **Response variability:** A response index is developed to determine variability in the profile response among select product grades and within the product grade on different production dates. This provides information related to

Profiling capability	Global stability	Mapping variability	Profile response variability
Information on controllable profile variations, which indicates if improvement capabilities exist	Information on accuracy of the sheet edge measurements, global mapping variability, and potential sheet curl impact on the control mapping	Information on linearity of the process map, local variation in the process map and consistency in the process map within a grade and between grades	Information on variability in the profile response across multiple zones and variability in the average profile response within a grade and between grades
Evaluates control performance for CD control	Evaluates automatic versus manual measurement of the sheet edges at the scanner and accuracy of the entered sheet edges at the profiler	Evaluates process mapping linearity and variability from multiple zone bump tests, for multiple product grades on multiple production dates	Evaluates individual and average profile response from multiple zone bump tests, for multiple product grades and on multiple production dates

profiling problems due to inconsistencies in the response magnitudes across the sheet and over-control potential between grades.

Implementation plan

The results of the profile grade diagnosis are described in a comprehensive report that includes an implementation plan. This plan provides recommendations for corrective actions, prioritized by severity and effort required to achieve solutions. In addition, the estimated financial benefits are provided.

Based upon the findings, recommendations may include re-tuning CD control, introducing CD grade tuning, modifying or changing sheet detecting and measuring devices, updating operating procedures, or adding mapping optimization controls.

Implement

Once recommendations have been defined, steps to enhance performance and creating a foundation for continuous improvement can begin. Services to implement improvement recommendations are in addition to the diagnose service and priced separately.

Approved recommendations can be implemented at one time, or incrementally over time; beginning with those that provide the greatest financial return. ABB is available to implement the improvements, work with site engineers, or work along with site personnel to achieve the desired performance level.

What sets this service apart

- **Trusted process:** The Profile Grade Performance diagnostic consists of well defined service modules that are delivered consistently, provide an accurate assessment, and ensure a practical corrective action plan can be identified.
- **Proven method:** Trial and error methods to achieve results are eliminated, or greatly reduced, when this diagnostic method is used to arrive at targeted corrective actions.
- **Your choice:** The included implementation plan gives you the options to make improvements yourself, employ ABB's Advanced Services team to implement recommendations, or some combination of both.

- **Exclusive tools:** Only ABB has the diagnostic and troubleshooting tools for data collection, and platform and process analysis that allows all ABB service engineers to deliver the assessment and additional implementation services consistently.
- **Return on investment:** The findings quantify the newly discovered performance gap in terms of dollars, showing you the financial benefit from implementing the improvement recommendations.

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