

re:Process Optimization Inc. Company Overview

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Overview

- **Founders**
- **Our Mission**
- **Services**
- **Project Examples**



Rob Evans Ph.D., P. Eng – President

- **20 yrs of experience in light metals**
 - Ph.D. Metallurgical Engineering (Queen’s University)
 - Fracture mechanics and damage in Al composites
- **13.5 yrs process optimization for Alcan/Novelis global R&D**
 - Global SME for vibration analysis and remediation
 - Global SME for ironing rolls/hold-down rolls
 - Led mechanical troubleshooting efforts on 4 continents
 - Processes ranging from remelt through to pack & ship
- **13.5 yrs Novelis instructor**
 - Rolling mill performance
 - Machine vibration
 - Physics of rolling
 - Metallurgy of Al alloys
 - Mentor to recent graduate engineers
- **5+ yrs Technology Transfer**
 - Internal and external technology
 - Technical and economic analyses for justification

Scott Kennedy B.A.Sc., MBA, P.Eng - Vice President

- **25 yrs. experience in research & consulting**
 - First part (~8 yrs.) of career spent in rail industry
 - Derailment investigations
 - Rail standards development
 - Field testing of rail wear/rail life
 - Design of steel tie
 - Most of latter part of career (post-MBA) spent at the interface of science and business
 - Cost and financial analyses of technical business decisions within:
 - Aluminum industry (while at Alcan)
 - Automotive industry (while at Alcan and Queen's)
 - Fuel cell and energy sector (while at Queen's)
 - Mining industry (while at Anderson & Schwab)



Our Mission

To objectively evaluate process or product issues from a technical and/or economic perspective.

Can it be resolved?

Should it be resolved?

Should it be replaced?



Our Services

- **Technical troubleshooting**
 - Analyze and suggest solutions to mechanical issues in process routes
- **Financial/business modeling**
 - Economic analyses of existing processes and potential changes
- **Technology transfer**
 - Technical and economic evaluation of new technologies
 - Capability/Justification/Project Management
- **Materials substitution analysis**
 - Process and cost evaluation of new materials/products
- **Process/business/market simulation**
 - Evaluate effect of changes to product/process/overall market



Examples of our work (1)

- **Hot mill sheet marking**
- **Hot mill scratch generation**
- **Cold mill chatter**
- **Technology transfer**
- **M&A and investment decision support**
- **Technology evaluation**
- **Market analysis**



Hot mill sheet marking

- **Transverse marks seen on hot mill hard alloy at tolling operation**
- **Reported mark spacings: 2210mm, 228mm, 12.7mm**
 - Operations reported hot mill vibration
- **HM vibration evaluated and eliminated as source of defects**
- **All defect sources located**
 - 2210 mm - zero mark
 - 228 mm - edge trim chopper mark
 - 12.7mm - hot mill backup roll grinder chatter
- **Grinder chatter source located**
 - Immediate and PM solutions recommended
 - Chatter eliminated
- **Benefit to client: retention of \$3M p.a. customer**



Hot mill scratch generation

- **Client reported sudden increase in longitudinal rolled in scratches on certain alloys from hot mill**
- **Evaluation of metal condition from hot reversing mill and hot finishing mill showed scratches occurring in hot finishing mill**
- **Carried out complete visual inspection of mill stands and mill data during mill outage**
 - Located entry table pickup causing scratches
 - Determined that metal transfer temperature between mills was too high (incorrectly measured) leading to metal sag onto entry table
- **Corrected transfer temperature and implemented PM to eliminate entry table pickup**
- **Benefit to client: eliminated excess scrap/minimized cleaning downtime**



Cold mill chatter resolution

- **Cold mill reported speed limitation of 600 m/min due to “5th octave chatter”**
- **Evaluated mill stand for resonances and forced vibration**
 - No resonance
 - Chatter measurable at all speeds
- **Proved chatter occurring at all times**
 - Not visible, but measurable at lower speeds
- **Located forcing function**
- **Ran trial demonstrating that full mill speed was possible given maintenance upgrades**
- **Benefit to client: >2x final pass speed upgrade, elimination of defect scrap**



Technology Transfer

- **Located novel technology for productivity issue on cold mill**
- **Evaluated technology at another facility – different material**
- **Evaluated technical feasibility of integration into cold mill**
- **Provided benefit estimate to senior management to justify experimental installation**
- **Project manager for Phases I & II**
 - Final mill-duty installation managed by operations
- **Benefit to client: elimination of defect scrap, reduction of downtime, ~15% speed increase**



M&A and investment decision support

- Assisted a metals/mining multi-national in decision to increase investment and/or engage in takeover bid for a rival...
 - needed to familiarise the client as to the competitive position and likely direction of an industry segment (iron ore) with which they were largely unfamiliar
 - included review of the assets (mostly mines and railway infrastructure in the Pilbara region of Australia, and the financial performance
 - further, provided a review of the dynamics and characteristics of the iron ore industry, and special considerations (pricing, and the way it is done and how it was changing)

- Performed an evaluation of a waste-coal power plant investment proposal in the Commonwealth of Pennsylvania for a large investment bank.
 - reviewed a myriad of factors, technical and economic: CFB technology, sampling of waste coal sites, slurry fines .vs. waste rock, power pricing, input material (limestone) fees, trucking allowances and finally, a full mining cost model was prepared



Technology evaluation

- Helped a growing enterprise face oncoming scrutiny by large investors, through evaluating their progress in moving from lab performance to commercial production (in the manufacture of diamonds).
 - the client needed help in providing relevant data (we set up a “data room”) for investors and put together the most appropriate financial and market information, and built a dynamic cost model and process simulation tool
 - we helped the client to recognize and offered help to overcome the largest and most pressing difficulties in progressing from laboratory success to manufacturing at a commercial level
- Evaluated the adoption of semi-solid forming of aluminum and/or aluminum composites in automotive production (mostly from a cost perspective).
 - constructed a cost model for production of semi-solid forgings of front-end automotive components, as compared with the incumbent materials and processes



Market analysis

- Assisted Alcan in the evaluation of a proposed foray into the marine and transport sheet market.
 - gathered all available relevant data regarding the marine and transport (heavy truck/trailer) markets
 - constructed cost curves for the industry segment (primarily the “shate” market, but some others also), and evaluated/proposed target acquisitions (as Alcan had no production capability for that product at that point)
 - discussed other alternatives (re-purposing of existing Alcan assets, for instance)

- Aluminum market analyses conducted for various clients
 - can sheet and automotive sheet, especially, as support for due diligence work whilst Alcan was divesting the rolled products business
 - similar undertaking for another potential buyer of another aluminum company

