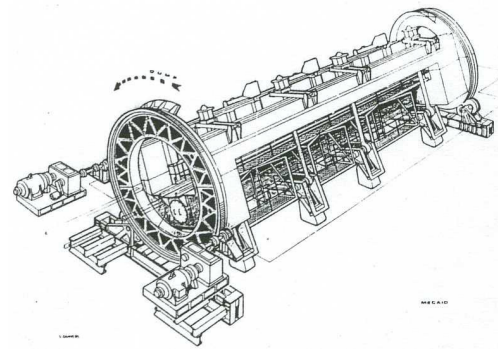


CONDITION & OPERATING ASSESSMENT OF HEAVY PROCESS EQUIPMENT & SUPPORT STRUCTURES

Study methods:

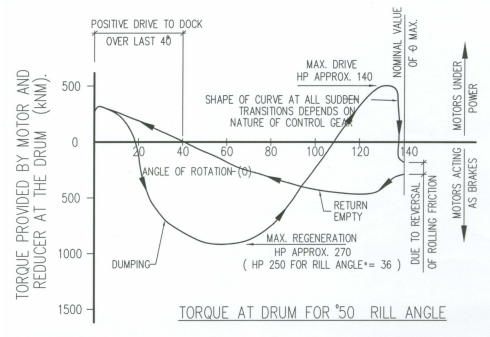
Evergreen Engineering's evaluation of heavy equipment and support structures are conducted by a phased study method. In the first instance the extent of the problem is determined and elements of the system requiring close examination are identified. At the completion of this phase of the project it is normal procedure for Evergreen to prepare a brief interim report documenting the findings and defining a program for satisfactory completion of the project under pre-agreed guidelines.



Rail Ore Car Tipper

Phase I engineering that is to be performed is outlined in a scope of work:

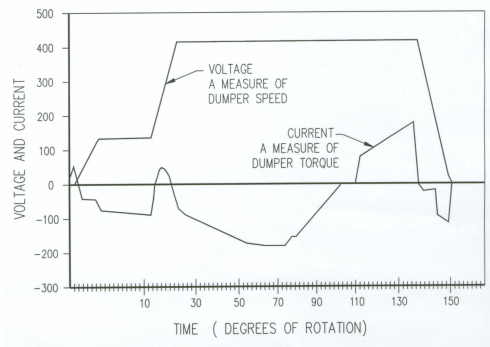
- ▶ Project coordination meetings
- ▶ Initial site visit (historical data collection)
- ▶ Determine performance criteria
- ▶ Initial tests and measurements
- ▶ Preliminary stress analysis
- ▶ Preliminary assessment
- ▶ Define future duty and life
- ▶ Interim report



Machinery Balance

The work to be performed in Phase II depends on the outcome of Phase I. The methodology is as follows:

- ▶ Detailed inspection, tests, and measurements
- ▶ Detailed analysis
- ▶ Determine optimum operating characteristics
- ▶ Identify solutions
- ▶ Issue study report with recommendations for interim modifications; remedial corrective measures; recommend parameters for a new system (when required); cost estimates and schedules.



Evaluation of equipment operation through motor voltage current curves.

(Continued on back)



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CONDITION & OPERATING ASSESSMENT OF HEAVY PROCESS EQUIPMENT & SUPPORT STRUCTURES (continued)

Assessments:

When it is necessary to carry out a detailed condition and operating assessment of heavy process equipment, to analyze the implications of continued operation, then this is accomplished through research and documentation:

- ▶ Performance criteria
- ▶ Operating history
- ▶ Manufacturer's data sheets
- ▶ Maintenance, repair, modification records
- ▶ Assessment and nondestructive test reports
- ▶ Fabrication and construction methods
- ▶ Motor and gear reducer data
- ▶ Electrical control systems
- ▶ Braking system
- ▶ Correlation of nondestructive testing with impact and fatigue damage and/or vibration severity
- ▶ Determine relative severity of damage
- ▶ Compare original design criteria with current operating conditions

Inspections and measurements:

On site studies of existing machine/structure performance are necessary once specified performance requirements cannot be maintained, or fatigue of components is observed.

Evergreen Engineering can provide the diagnostic testing for machine/structure performance and evaluate the findings with respect to specified performance criteria for machine/structure as well as human response.

Structural analysis is provided to determine the structures capability to safely resist the imposed loadings.

Maximum benefit from an evaluation program will result from the thorough field investigation provided by Evergreen Engineering.

When corrective measures are required then Evergreen will provide detail custom design to meet acceptable serviceability requirements for structure, equipment, and personnel.



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