

## DATA ACQUISITION SYSTEM FOR ORE RECLAIMER MACHINE

PCE Ltda. developed a data acquisition system for use on a Ore Reclaimer Machine for the *Companhia Vale do Rio Doce* in Carajás - Pará - Brazil.

The system is basically composed by:

- Sensors;
- Acquisition Hardware – a computer and acquisition board;
- Acquisition and Data Analysis Software.

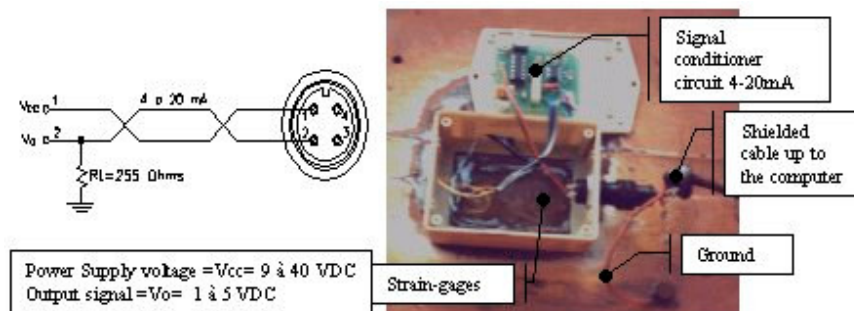
The computer is located in the upper electrical house as shown in the figure:

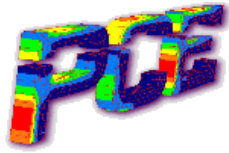


- Sensors

### Strain Sensors

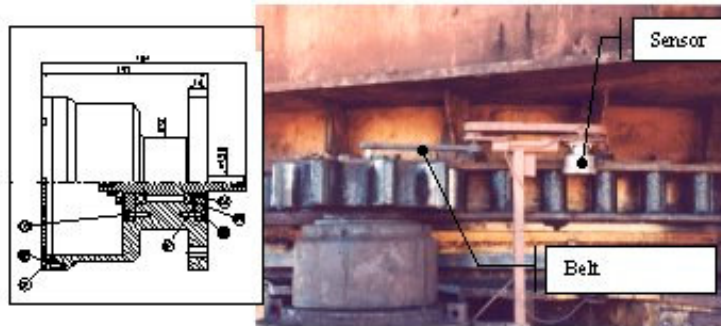
The strain sensors are *strain-gages* type, bonded on 10 points of the crane arm. The signal conditioner supplied by PCE is a CSSG-420 model, type 4-20mA and is placed in a box upper the strain-gages.





#### Horizontal Angular Position Sensor

The horizontal angular position sensor is an absolute encoder, EA10V model, potentiometer type, supplied by PCE. It is placed close to the right angular positioner engine. Due to the little space for the assembly we had to use belts and gears to transfer the engine rotation to the encoder. The signal is conditioned to 4-20mA .



#### Bucket Wheel Electric Current Sensor

Assembled on the electric control panel of the engine, in the upper power house. It is a type hall effect sensor, made by Honeywell Micro Switch, with an output signal from 4 to 20 mA, accepting up to 950 A.

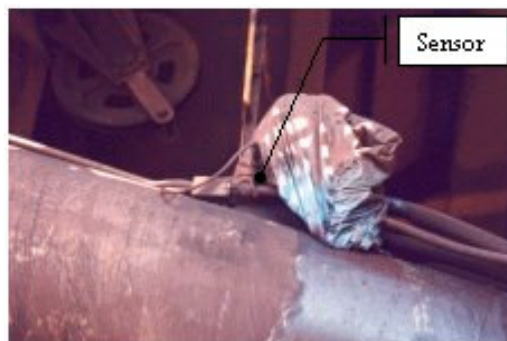
#### Vertical Angular Position Sensor

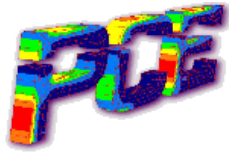
The vertical angular position sensor is an absolute encoder, EA360 model, potentiometer type, supplied by PCE. It is placed on the crane arm, close to the joint of this with the column.



#### Hydraulic Cylinder Pressure Sensor

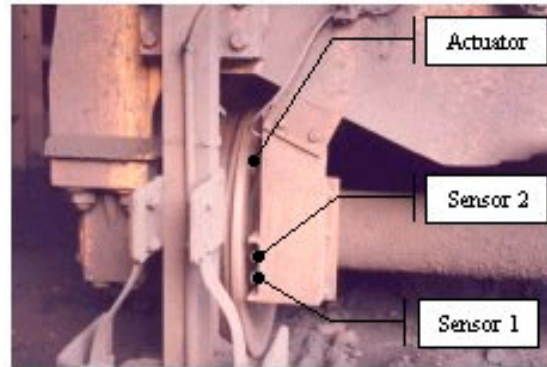
Made by Hytronic, they provide a signal from 4 to 20 mA.





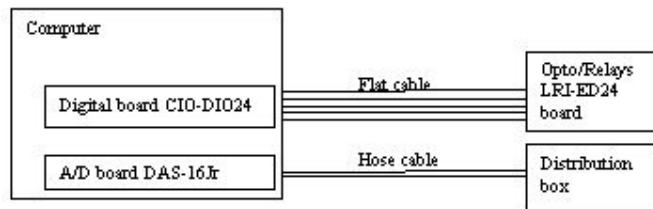
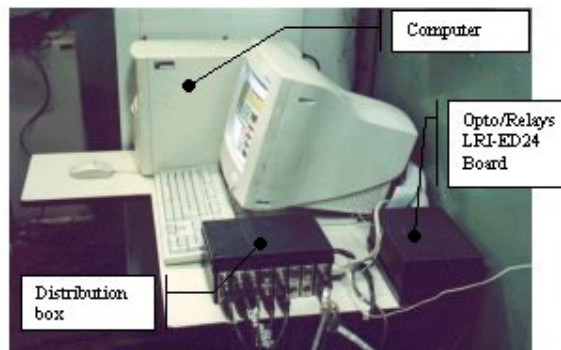
Machine Position Sensor

Two inductive PS15-30GM50-N45 model sensors, supplied by Sense. They are placed at one of the trucks, while two actuators are welded on the truck.



- Acquisition Hardware

The acquisition hardware consists of a Pentium II computer with 32 MB RAM and 3 GB HDD. For the data acquisition, two acquisition boards made by Computerboards was used. The analog board is a CIO-DAS 16Jr with 16 analog channels and the digital board is a CIO-DIO 24 with 24 digital channels.



- Acquisition and Data Analysis Software.

The acquisition software consists of a Visual C++ software that reads the acquisition board, showing the values in real time on the screen while it stores them in a file for posterior analysis.

