

Advances In Dynacard Acquisition And Processing: A Fully Autonomous Instrument

Gustavo Moreno, YPF

Author Block: G.A. Moreno; A. Garriz, A. Facciopieri, F. Sanchez, YPF Tecnología;
M. Paura, A. Terlecki, M. Dos Santos YPF; F. Remersaro, EXEMYS

Abstract:

Objectives: Dynamometer data is the most important piece of information to analyze the downhole behavior of wells with beam pumps. State of the art instrumentation requires the installation of multiple devices and compute/communication units to compute the downhole card and communicate it to the SCADA. In this work we show how new techniques can be used in a single fully autonomous device to do the same job, optimizing field deployment and reducing the instrumentation cost.

Methods:: The concept driving the design of the system was cost reduction.

Measurements are based on accelerometer and load cell readings of the polished rod but, in contrast to other deployments in the literature, here we have developed a new set of numerical methods that allowed on the fly Fourier transformation, filtering and integration on board. These methods are the key to enclose both the sensors and the processing unit on a single device, achieving state of the art accuracy and full monitoring capabilities in a single compact unit.

Results, Observations, Conclusions: The benefits of integrating all the electronics on a single device have a sizable impact on the implementation cost. In this work we briefly explain the R&D process and field trials that guided the development of this new instrument. The system was specially targeted to low production wells, where instrumentation is many times relegated. Field trials of this technology are analyzed in detail with excellent results for a wide range of situations such as full pump, fluid pound, plunger tagging and valve leaking. These examples show that this technology enables full instrumentation of the well in 20 minutes, which is a fraction of the typical operation intervention time for this kind of data acquisition

systems. State of the art precision measurements and onboard downhole card inference are successfully demonstrated.

Novel: The system described in this work is a patent pending device that allows measurement, processing and diagnoses of sucker rod pumping units within a single apparatus. In this work we describe the technical advantages of the methods embedded in the unit and exhibit field cases of the technology implementation.