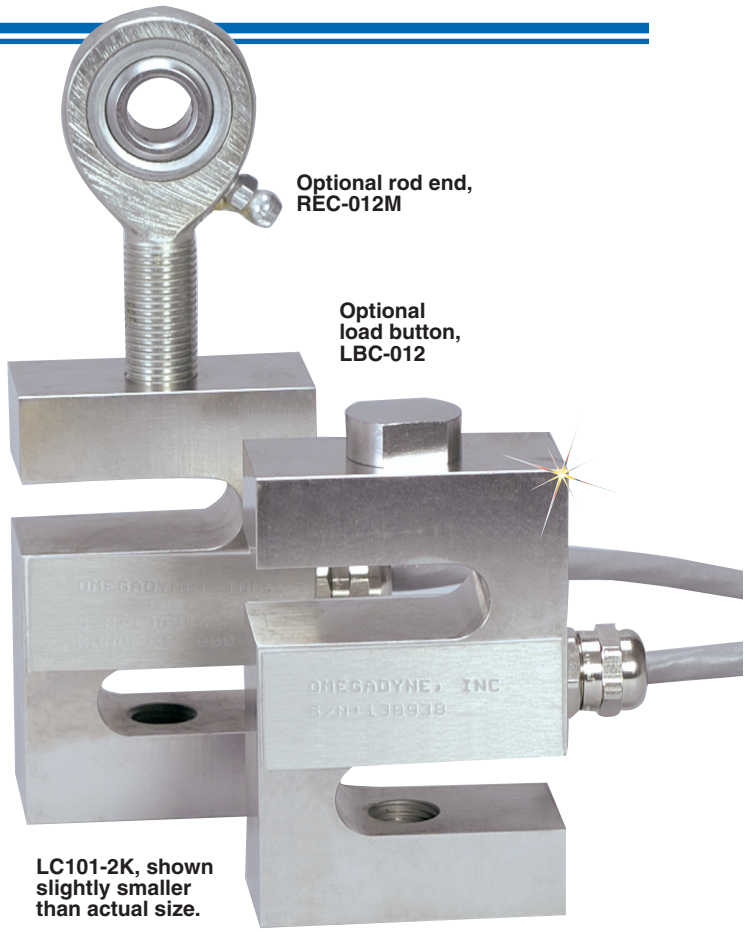
OMEGADYNE® LOAD CELLS AID WELLHEAD DESANDING

We are all aware of the ever-increasing global consumption of energy and the demand this has created for more oil and gas. In response, output has been stepped up at many oil and gas fields throughout the world, and many new sites, some in harsh environments and with difficult extraction issues, have entered production. A problem that can occur with accelerated production and the opening of marginal sites is the presence of large quantities of sand in a well's output. This sand can cause severe erosion damage to the wellhead equipment, piping, and valves, presenting the risk of total blockage to the flow of product. To address this issue, highly specialized desanding devices can be used to protect the wellhead extraction equipment and to ensure a clean product for further transportation or processing.

Desanders are designed to tie directly into the wellhead in order to eliminate potential erosion points and clogging downstream. They require periodic servicing to remove the collected sand before the unit fills up and becomes ineffective. A wellhead located in a remote location with no permanent personnel onsite presents a special problem and, when this location is also in a harsh environment, additional cost and risk factors are introduced. Operator time, fuel costs, and travel risks can be substantial just to check a desander and find that it does not need maintenance yet. Or worse, to find that it is full and there is damage and contaminated product downstream. It was just this set of circumstances at a gas wellhead site in the frigid wilds of Alberta, Canada that brought together Remote Systems of Calgary, Alberta and Omegadyne, Inc. of Sunbury, Ohio to combine their respective products and expertise.

Remote Systems designs and installs a standalone, real-time data acquisition system called the Livebox, which was developed for remote monitoring applications. The Livebox is completely self-powered and uses solar or wind power for battery recharging. This unit can interface with nearly any combination of sensing and monitoring devices, including cameras, to provide data, such as flow rate, pressure, and temperature, and other pertinent information about the site. The collected information is then sent by a cellular or satellite link to a secure server where it is made available to the customer through a customized web portal. This enables the engineer responsible for the desander at the wellhead to monitor its status and accurately determine cleanout intervals without visiting the site and checking it out manually.



LC101-2K, shown slightly smaller than actual size.

Cleanout operations are expensive and incur a risk factor for personnel, so it is very desirable to optimize this procedure. With the Livebox system in place it is possible to determine exactly when to clean out the desander, thereby improving efficiency and safety without risking overflow of sand into downstream piping and instruments. The problem faced by Remote Systems was how to accurately measure the amount of sand in the desander. The most obvious method was to weigh it, but by what means? This is where Omegadyne, Inc. came in.

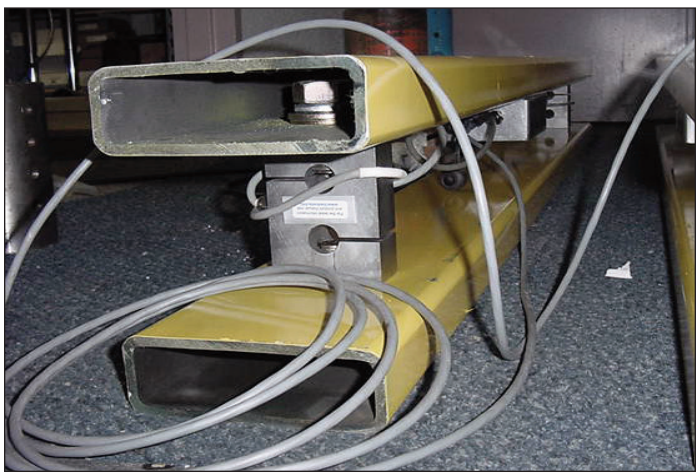
Omegadyne is a world-class designer and manufacturer of state-of-the-art products for the measurement and control of pressure, torque, load, and force. They offer more than 10,000 different products in these categories and have extensive experience and capability in product customization. Omegadyne sensors are used by governments and industry around the world in processing plants, aerospace applications, oceanography, robotics, water management, food processing, and oil exploration.

In collaboration with Remote Systems, Omegadyne tackled the problem of how to accurately measure the quantity of sand in the desanding unit. Using a load cell seemed like a good approach, but this was not a simple application. The desanding unit can weigh thousands of pounds when full of sand, and, in order to make an accurate measurement, the load cell must bear this full weight. In addition, the harsh environmental conditions required a unit not only able to withstand extremely low temperatures, but also to function while fully exposed to the outdoor environment.

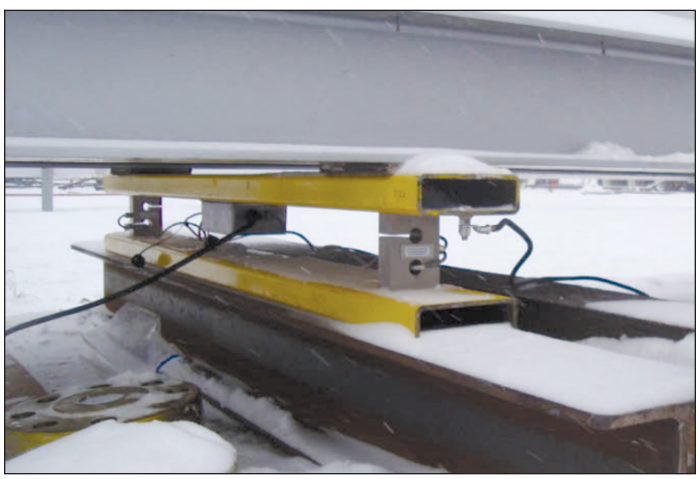
The load cell chosen for this difficult application was a model from Omegadyne's LC101 product line with a load rating of 10,000 lbs. This is an S-Beam design that uses strain gages to convert the load into an electrical signal. This unit works in both compression and tension, has all stainless steel construction and is designed to be FM intrinsically safe. The outputs of different units match within 0.25% so they are interchangeable and are well-matched when used in multiple load cell applications. The LC101 product line is designed to operate at temperatures as low as -40°C (-40°F), so the Canadian location was not a problem.

The solution finally settled upon using 4 of these load cells mounted between two pairs of beams, one of which is shown in the photo to the left. The desanding unit was mounted on these beams and the load cells carried its full weight. By combining the load measured by each cell, and subtracting the weight of the desanding unit, the amount of sand captured could be easily determined. The bottom photo shows one of the beam pairs supporting its portion of the desander. Since the load cells continuously generate an output, the fill level of the desander was available at all times, and could be transmitted based on the customer's requirements.

This project is an excellent example of synergy between two companies with quite different products. Each brought a special capability and expertise to the problem: Remote Systems with their experience in remote monitoring and web portal design, and Omegadyne, Inc. with their extensive engineering know how in load measurement and an unusually broad product line. The end result was an elegant and general solution for remote sand level measurement that can be used at other sites around the world.



Beam pair separated by load cell.



One beam pair supporting the desanding unit.

Desanding unit after installation on the load cell beam pairs.