Q. ***What tools are available for applying the total life cycle costing to selection of mechanical seal systems?***

A. The total Life Cycle Cost (LCC) of any equipment is the total "lifetime" cost to purchase, install, operate, maintain and dispose of it. Determining LCC involves following a methodology to identify and quantify all components of the LCC equation.

In today's competitive world, companies are expected to improve their financial performance while dealing with tighter environmental regulations, increased occupational safety requirements and escalating costs of raw material and energy. This has put a great deal of attention on the immediate need to reduce cost and optimize return on a company's investments in the short term.

An emphasis on short-term cost reduction, though, can encourage the uninitiated to focus primarily on "initial cost" of pumps and sealing systems when evaluating investments and operating decisions, thus potentially ignoring collateral effects that can significantly impact operating costs throughout the life of the equipment. End users with a longer-term perspective, however, will look beyond initial cost to identify these collateral effects, estimate their financial implications and consider the LCC of the investment and operating decisions they make. Because it tends to be a tedious exercise, alien to most engineers and devoid of user-friendly tools, this type of LCC analysis isn't always done.

When used to compare mechanical seal design or overhaul alternatives, the LCC process leads to the most cost-effective solution within the limits of the available data. The components of a seal LCC analysis typically include initial purchase cost of the seal, support system, auxiliary services, installation and commissioning, energy costs, operating costs, seal maintenance costs, equipment maintenance costs, downtime and loss-of-production costs, environmental costs and decommissioning and disposal costs. For example, environmental costs are tied into seal system design since both fluid specific gravity and emission level requirements dictate the recommended seal system design (see Figure 1). But, that's only one part of the story.

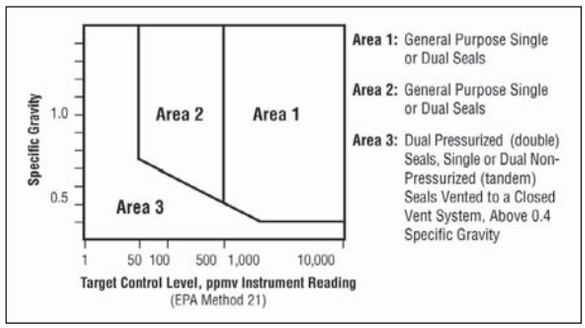

Figure 1. Mechanical Seal Emissions Application Guidelines

In the case of mechanical seals and sealing systems used on rotating equipment, such as pumps, compressors, mixers and agitators, maintenance and reliability engineers have always had an intuitive understanding of LCC trade-offs between "lowest initial cost" and "best available technology" products. They know that the consequences of repetitive failures on maintenance expenditures and resources, equipment downtime, safety and the environment can far exceed the initial cost of even the most expensive sealing systems. On the other hand, there never has been an agreed-upon industry approach to the analysis and quantification of LCC for mechanical seals and sealing systems, even if there is a consensus that LCC can be an effective management tool in *cost-reduction* efforts.

The *Seal Life Cycle Cost Estimator* software tool has been created to provide users of sealing devices and systems with an analytical method to evaluate the LCC of sealing systems and maximize sealing-system lifetime cost savings. The sealing industry's most complete and up-to-date tool for life-cycle cost analysis, it is intended to compliment the joint Hydraulic Institute/Europump publication, *Pump Life Cycle Costs: A Guide to LCC Analysis for Pumping Systems.*

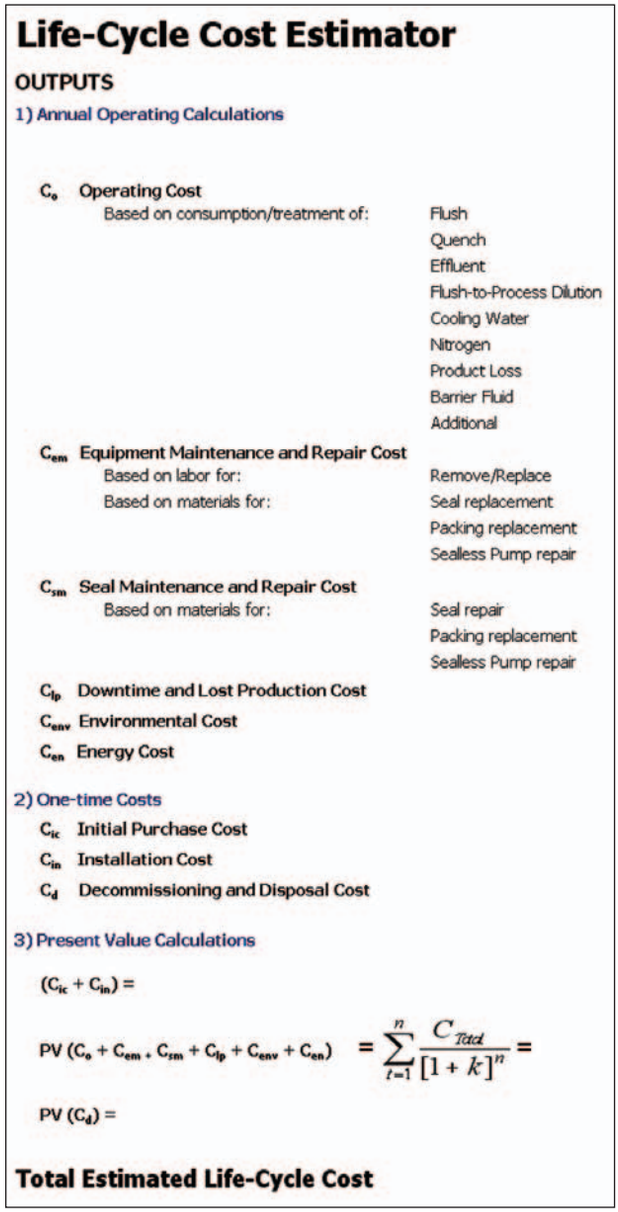

Figure 2. Sample Output LCC Estimator Tool

This software tool includes sample LCC cost calculations for several design options based on a set of industry-consensus assumptions (see Figure 2). It can be used to improve existing or planned installations for a variety of applications. Each case applies an LCC analysis and shows the potential for reductions in maintenance, energy and total LCC. It is intended for use by reliability, maintenance, and project engineers, consultants, plant operators, and seal manufacturers and their representatives, as well as government agencies, municipalities and others that are responsible for buying, applying and operating mechanical seals and sealing systems.

The *Seal Life Cycle Cost Estimator* is not intended to offer an absolute method of calculating total cost of seal or sealing system ownership. Instead, it's expected that each business or organization using it will assign different values when evaluating LCC. It will, though, be an effective way to compare the LCC of two or more possible sealing systems within an organization utilizing comparative cost values.

The tool is the result of collaborative efforts between the European Sealing Association (ESA) and the Fluid Sealing Association (FSA). Its purpose is to provide guidance to users and specifiers of mechanical seals to facilitate the calculation of comparative Life Cycle Costs for the inevitable array of alternatives available to them.

The *Seal Life Cycle Cost Estimator,* deployed in conjunction with *Pump Life Cycle Costs: A Guide to LCC Analysis for Pumping Systems*, constitutes a valuable "tool kit" to optimize the LCC for all pump and seal systems. The estimator currently is available on the FSA web site: ***www.fluidsealing.com.*** Click on *Divisions,* then *Mechanical Seal* for an evaluation.

Next Month: *Selection and installation procedures for gaskets used in pump piping systems.*

FSA's updated *Mechanical Seal Handbook* is now available. Reflecting advances in sealing technology and application, it provides valuable information on the selection and use of the most popular mechanical seal designs, configurations and materials.

Subjects include Safety, Selection, Design and Classification, Environmental Controls, Installation, and Troubleshooting. A comprehensive Materials Selection Guide provides guidance in the proper selection of metal components, face materials, and secondary seals. An extensive Glossary of terms takes the mystery out of the language of mechanical seals, and includes a simple explanation of balance ratio, including calculation formulae. Line and photographic illustrations complement this easy-to-read 48-page text.

The *Mechanical Seals Handbook* is a valuable reference for process industries personnel involved in plant maintenance, operations, reliability, and engineering. It also is useful for designers of OEM rotating equipment, and for distributor personnel charged with technical support for their process industry clients.

Price per single copy is $25.00, with volume discounts available. To purchase, please e-mail fsa@pump-zone.com