

Enhance Your Performance and Decrease Energy Costs

Heat Exchanger Health Monitoring



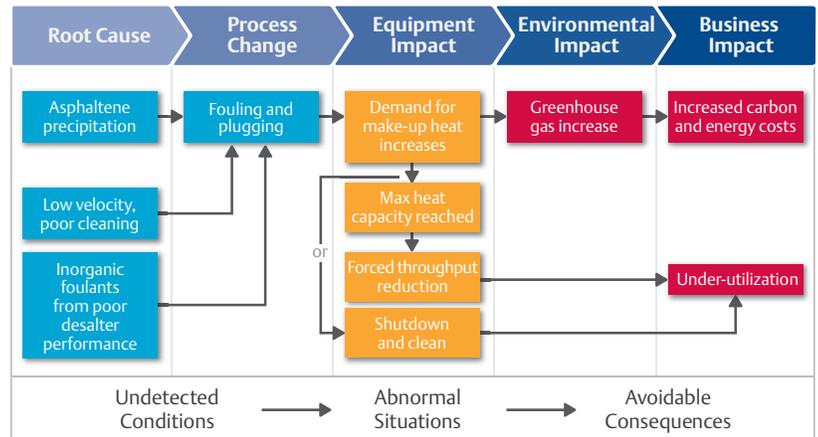
Integrated Solutions for Effective Decision Support

Energy consumption remains one of the largest controllable costs in oil refineries. One major cause of poor energy efficiency and production loss is heat-exchanger fouling.

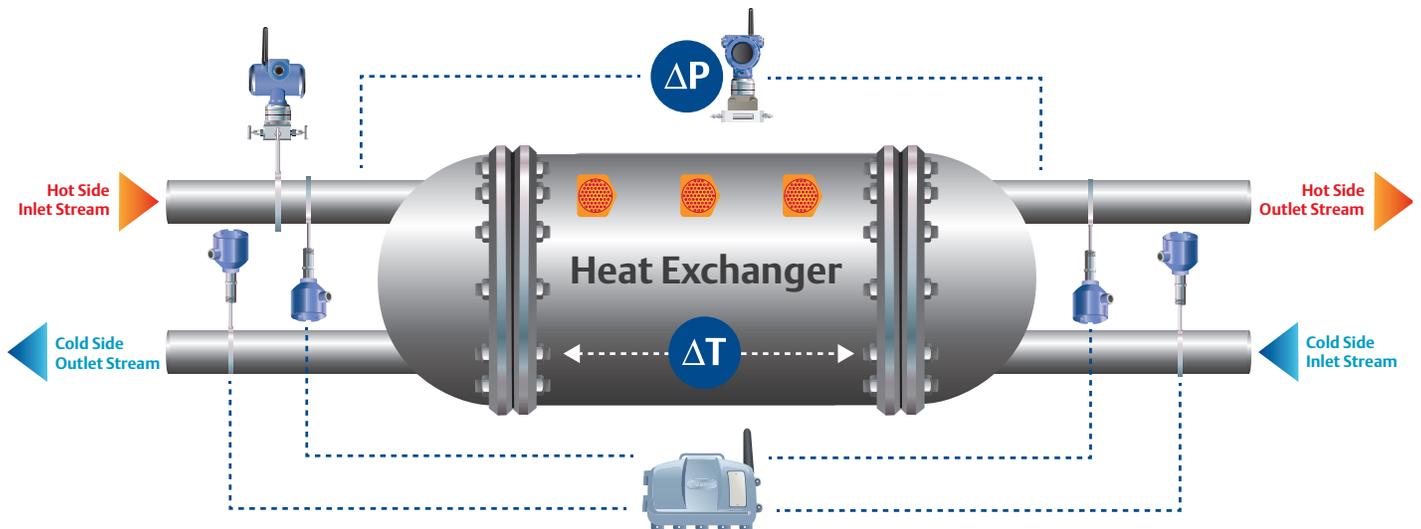
Many factors lead to heat-accelerated fouling. Asphaltene precipitation is one of the major causes and can lead to performance limitations within days. This kind of precipitation is happening because, more and more, refiners are unknowingly blending incompatible crudes.

Multiple complex variables make fouling unpredictable. In an average refinery, avoiding even a small percentage of fouling can result in significant savings every year. Using online heat-exchanger monitoring to calculate changes in heat transfer will provide early alerts about accelerated fouling, as well as indications of when to clean, based on the economics of energy and cleaning costs.

Anatomy of a Heat Exchanger Failure



Common Threats to Heat Exchangers



FOULING AND PLUGGING

Fouling on the exchanger's tubes can result in increased energy costs by increasing the demand for make-up heat. Fouling can also cause unit under-utilization when fired heater reaches its maximum heat capacity and forces a reduction in throughput or a shutdown for cleaning. Root causes can include asphaltene precipitation, poor desalter performance, or poor cleaning performance.

What if you could...

Increase Process Availability

See abnormal situations as they are happening. Get early detection of accelerated fouling in crude unit pre-heat exchangers (asphaltene precipitation). Know the optimum time to clean your heat exchangers. Receive alerts based on heat transfer degradation and economic calculations.

Improve Asset Reliability

Know the trend of an asset's health at all times. Know when the equipment is healthy, is in a warning stage, or escalates to critical. Maintain equipment at the most cost-effective time. Easily gather equipment fault-alert data so that repeat failures can be analyzed and addressed.

Mitigate Safety and Environmental Risks

Be alerted to potential safety hazards. Know when intermediate heat exchanger bundles are near temperature design limits.

Increasing your profit

Heat lost due to fouling must be made up in the fired heater, increasing your fuel costs. Care to get that back?

UNITS, CAPACITIES, AND MARGINS			ENERGY LOSS RECOVERY		
Unit Name	Capacity Input (BPD)	Assumed Margin (\$/Bbl)	Energy Loss from Fouling* (MBtu/Yr)	Energy Loss from Fouling (\$/Yr)	Energy Loss Recovery (\$/Yr)
Crude Unit	250,000	\$2.00	1,640,000	\$9,860,000	\$990,000
Vacuum Unit	112,500	\$1.00	490,000	\$2,960,000	\$300,000
Fluid Cat Cracker (FCCU)	87,500	\$5.00	460,000	\$2,730,000	\$270,000
Naptha Reformer	50,000	\$2.00	160,000	\$990,000	\$100,000
Coker	37,500	\$8.00	230,000	\$1,400,000	\$140,000
Hydrocracker	25,000	\$6.00	120,000	\$740,000	\$70,000
Hydrotreaters	175,000	\$0.50	560,000	\$3,350,000	\$340,000
TOTAL RECOVERY					\$2,210,000

UNITS, CAPACITIES, AND MARGINS			CAPACITY LOSS RECOVERY		
Unit Name	Capacity Input (BPD)	Assumed Margin (\$/Bbl)	Capacity Loss from Fouling** (%)	Capacity Loss from Fouling (\$/Yr)	Capacity Loss Recovery (\$/Yr)
Crude Unit	250,000	\$2.00	11%	\$5,020,000	\$502,000
Vacuum Unit	112,500	\$1.00	11%	\$1,140,000	\$114,000
Fluid Cat Cracker (FCCU)	87,500	\$5.00	11%	\$4,440,000	\$444,000
Naptha Reformer	50,000	\$2.00	4%	\$370,000	\$37,000
Coker	37,500	\$8.00	7%	\$1,830,000	\$183,000
Hydrocracker	25,000	\$6.00	7%	\$910,000	\$91,000
Hydrotreaters	175,000	\$0.50	8%	\$610,000	\$61,000
TOTAL RECOVERY					\$1,432,000

Assumptions

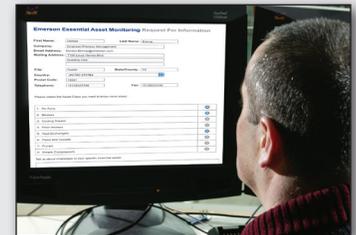
- Energy cost is \$6/MBtu
- * Number of heat exchangers used in this example is 80
- * Pre-heat fouling maximum is 20%
- * Fired heater efficiency is 80%
- ** If fired heater is limited, the % of time the unit is at maximum capacity is 25%

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HeatExchangers**



Heat Exchanger Solution

Emerson's Heat Exchanger Monitoring solution embeds process and exchanger knowledge into software and wireless instrument applications for cost-effective and easy monitoring of individual exchangers for fouling. Dynamic real-time temperature and pressure measurements are trended, historized, and analyzed, delivering alerts in advance of fouling and cleaning needs.



Request Information

Use our simple online form to select the options most important to you. An Emerson specialist will contact you shortly.



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SOFTWARE INTERFACE



AMS SUITE: ASSET GRAPHICS FOR OPERATIONS

Provides real-time graphical displays that indicate abnormal operation, including heat-transfer calculations and high fouling-rate or exchanger cleaning-required notifications. A pre-engineered algorithm delivers diagnostic information for alarms, process analysis, trending, historization, and key performance indicators.



NETWORK INTERFACE



SMART WIRELESS GATEWAY

Connects IEC 62591 (WirelessHART®) self-organizing networks with host systems and data applications.



DEVICES



ROSEMOUNT WIRELESS TEMPERATURE TRANSMITTER

A wireless solution for high-density temperature measurement applications. Monitors up to four independently configurable RTD, thermocouple, ohm, millivolt, and 4-20 mA inputs, allowing you to access more temperature measurements without any signal wire. Allows measurement of inlet/outlet temperatures for hot or cold sides of the exchanger for heat-transfer calculations and high fouling-rate detection.



ROSEMOUNT WIRELESS DP FLOWMETER

Integrates industry-leading transmitters with industry-leading primary elements, improving flow performance across wider flow ranges. Allows measurement of flow for hot or cold side of the exchanger for heat-transfer calculations and high fouling-rate detection.

The minimum requirements are the flow and inlet/outlet temperatures for one side of the exchanger; all four temperatures are required for other key performance indicators.

ADDITIONAL OPTIONS



ROSEMOUNT WIRELESS PRESSURE TRANSMITTER

Offers the industry standard in pressure detection, with capabilities meeting any need. Detects increase in differential pressure across hot or cold side of the exchanger, which indicates the exchanger needs cleaning.



AMS SUITE FOR MAINTENANCE

Allows maintenance personnel to diagnose equipment problems using predictive diagnostics. Early warning enables planned maintenance practices and reduces downtime.

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