

- b) Allows for preemptive corrective actions
- c) Decrease in equipment or process downtime
- d) Decrease in costs for parts and labor
- e) Better product quality
- f) Improved worker and environmental safety
- g) Improved worker moral
- h) Energy savings
- i) Estimated 8% to 12% cost savings over preventive maintenance program

Disadvantages:

- a) Increased investment in diagnostic equipment
- b) Increased investment in staff training
- c) Savings potential not readily seen by management

### **3.8.2 Predictive Testing and Inspection (PT&I)**

PT&I, also known as predictive maintenance or condition monitoring, uses primarily non-intrusive testing techniques, visual inspection, and performance data to assess machinery condition. It replaces arbitrarily timed maintenance tasks with maintenance that is scheduled only when warranted by equipment condition.

Continuing analysis of equipment condition-monitoring data allows for the planning and scheduling of maintenance or repairs in advance of catastrophic and functional failure. Collected PT&I data is used for trend analysis, pattern recognition, data comparison, tests against limits and ranges, correlation of multiple technologies and statistical process analysis to determine the condition of the equipment and to identify the precursors of failure. PT&I does not lend itself to all types of equipment or possible failure modes and therefore should not be the sole type of maintenance practiced.

A variety of PT&I methods are used to assess the condition of systems and equipment. These technologies include intrusive and nonintrusive methods as well as the use of process parameters to determine overall equipment condition. The data acquired permits an assessment of the system or equipment performance degradation from the as-designed condition. The most common PT&I technologies are the following:

- a) Vibration Analysis.
- b) Lubricant and Wear Particle Analysis.
- c) Thermal Imaging and Temperature Measurement.
- d) Passive (Airborne) Ultrasonics.
- e) Electrical Testing and Motor Current Analysis.
- f) Flow Measurement and Leak Detection.
- g) Valve Operation.
- h) Corrosion Monitoring.
- i) Process Parameters.
- j) Visual Observations.