CHAPTER 19

Financial implications and cost justification

G. Eade

Asset Management Centre Ltd, Ludworth Trout Farm, Marple Bridge, Cheshire, SK65NS, UK

19.1 INTRODUCTION

The simple process of financial justification for an investment project, would normally be to compare the initial and on-going expenditure with the expected benefits, translated into cost savings and increased profits. If the capital can be paid off in a reasonable time, and concurrently earn more than an equivalent investment in secure stocks, then the project is probably a good financial investment.

The case for buying a new machine tool, or setting up an extra production line, can be assessed in this way, and is the normal basis on which a business is set up or expanded. The purchase price plus installation, recruitment and training costs, must be paid off within a limited number of years, and continue to show a substantial profit after deducting the amount of borrowed capital, operating cost and so on.

However, the benefits from an investment in a condition monitoring (CM) system are more difficult to assess, especially as a simple cost/benefit exercise. This is because, to put it simply, the variables are much more intuitive and less measurable than pure machine performance characteristics (Eade, 1989).

The ultimate justification for condition monitoring is where a bottleneck machine is totally dependent on a single component such as a bearing or gearbox, and failure of this component would create a prolonged unscheduled stoppage affecting large areas of the plant. The cost of such an event could well be in the six-figure bracket, and the effect on sales and customer satisfaction beyond quantification.
Yet a convincing financial case is highly dependent on knowing how often this sort of disaster is likely to happen, and also a precise knowledge of the unquantifiable factors referred to above. At best, one can only say that, whatever the cost, if it is likely to happen, it would be foolish not to install some method of predicting it, so that the appropriate preventive action could be taken.

19.2 ASSESSING THE NEED FOR CONDITION MONITORING

Any maintenance engineer's assessment of plant condition is influenced by a variety of practical observations and analyses of machine performance data, such as:

- the frequency of breakdowns;
- the randomness of breakdowns;
- the need for repetitive repairs;
- the number of defective products produced;
- the potential dangers linked to poor performance;
- any excessive fuel consumption during operation;
- any reduced throughput during operation.

These, and many more pointers, may suggest that a particular item of plant requires either careful monitoring, routine planned preventive maintenance, better emergency repair procedures, or some combination of all these approaches in order to ensure a reasonable level of operational availability. The engineering symptoms can, however, rarely be quantified accurately in terms of financial loss. Very few companies can put an accurate figure on the cost of downtime per hour. Indeed, many have no reliable records of their aggregate downtime at all, even if they could put a value per hour on it!

Thus, although a maintenance engineer may decide that a particular machine with a history of random bearing failures requires condition monitoring, if problems are to be anticipated, and the plant taken out of use before a catastrophic in-service failure occurs, how can he or she justify the expenditure of say £10000 on the appropriate monitoring equipment, when plant and production records may be too vague to show what time and expense could be saved, and what this saving represents in terms of profit and loss to the company? This is a dilemma which can be a daily occurrence, and one which does face engineering and maintenance staff in large and small companies throughout the country.

As if the practical problems of quantifying both the potential losses and gains were not difficult enough, then the status of maintenance engineering in many organizations is such that any financial justification,