

# Health and safety cost benefit analysis calculator.

## Introduction

The QBE Health and Safety Cost Benefit Analysis calculator allows the costs and benefits of investments to improve workplace health and safety to be compared. In doing so, the merits of health and safety improvement programmes being considered for implementation in workplaces can be objectively appraised. The tool works by helping organisations assign suitable financial values to common costs incurred when investing in health and safety improvement programmes, along with suitable values of common benefits realised. It then carries out a formal cost benefit analysis of the costs and benefits and returns a set of investment appraisal metrics.

## Investment metrics calculated

**The following metrics are calculated by the tool for the investment under consideration:**

1. Net present value or NPV (£)
2. Payback period (years)
3. Return on investment or ROI (%)
4. Benefits to costs ratio
5. Internal rate of return or IRR (%)

## Cost categories considered

In carrying out a cost benefit analysis of a workplace improvement programme it is useful to differentiate between two categories of investment costs, the costs of initial set-up or start-up, and the recurring or running costs. Initial set-up costs might include: the costs of planning, preparation and implementation, purchase of equipment and materials, equipment installation and initial staffing/retraining. Recurring costs in contrast might include: the costs of equipment maintenance, energy and other consumables and ongoing staffing/training.

To ensure that the full range of incurred costs are considered in the analysis undertaken, the user is invited to consider start-up costs and recurring costs under a range of default cost categories (these can be edited if the user so wishes). For start-up costs, the default categories are planning, preparation, implementation/installation, equipment/materials, initial staff training and specialist advice. For recurring costs, the default categories are equipment maintenance, energy/other consumables, staffing, ongoing staff retraining and capital depreciation/interest.

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## Benefit categories considered

The benefits of a health and safety improvement programme might include the benefits associated with adverse health and safety events prevented (including avoided injuries and cases of work related ill health). Theoretically, these could be worker related (e.g. the avoided costs of sickness absence, presenteeism and health and rehabilitation programmes) or more organisational related (e.g. the avoided costs of higher employer's liability insurance and private health insurance premiums, production disturbance, managing sickness absence, investigating incidents and prosecutions). They might also include the potential benefits of operational efficiency gains.

Other, more intangible benefits of a health and safety improvement programme might include the positive impacts on staff morale, job satisfaction, corporate image and staff turnover. However, as these latter benefits are often difficult to express in monetary terms, they tend not to be directly considered in the cost-benefit analysis, but are instead considered separately by decision-makers as part of the wider evaluation of the business case for the intervention.

Like the start-up and recurring costs, the user is invited to consider the potential benefits of a workplace intervention under a range of different default categories in the 'Inputs' sheet. Alternatively, the user could use appraisal values published by the [Health and Safety Executive \(HSE\)](#). HSE produces annual cost estimates of injuries and new cases of ill health complaints in Great Britain associated with current working conditions. From these total cost estimates, HSE calculates 'appraisal values'. You can use the appraisal values for the costs to employer per injury or ill-health case. The rationale is that the financial costs you would incur from worker injury or ill-health may be avoided from the implementation of a workplace intervention. HSE's appraisal values take into account the average financial cost to the employer from a fatal injury, non-fatal injury (more than 7 days absence or up to 6 day absence), or ill-health (more than 7 days absence or up to 6 days absence) case.

The appraisal values incorporate sick pay, insurance premiums, production disturbance, administrative costs, and costs from investigations and prosecutions.

**Sick pay:** Occupational sick pay and/or statutory sick pay paid to employees when absent from work.

**Insurance premiums:** The cost of Employers' Liability (EL) insurance premiums and the cost of corporate private health insurance premiums attributable to workplace accidents and work-related ill health.

**Production disturbance:** The costs associated with work reorganisation and recruitment and induction of temporary or permanent replacement staff, in order to maintain output.

**Administrative costs:** The costs associated with administering sickness claims; insurance claims; compensation claims etc.

**Investigations and prosecutions:** The internal and legal costs arising from investigations and prosecutions for health and safety breaches by HSE or local authorities.

The appraisal values are useful estimates for those businesses that do not have appropriate internal estimates/data available; if you do have business-specific data it may be more suitable for your assessment.

In addition, the user is also invited to assign monetary values, where able, to the financial benefits accrued through potential gains in operational efficiency and the other, more intangible benefits, as described above.

For more information on HSE's Cost to Britain research, the reader is referred to the following report accessible via the [HSE website](#).

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## Projected success of intervention

The calculator tool has been developed to estimate the projected net benefits of implementing an intervention in a workplace under the premise that the intervention will lead to a reduction in the number of cases of work related injuries and ill health from a pre-intervention or business-as-usual level. Carrying out a full evaluation of the business value of an intervention therefore requires an appreciation of the average number of cases of injury and ill health that occur in your workplace each year currently and how these might be reduced as a direct result of the intervention.

Multiplying these projections of incidents avoided by HSE's unit appraisal values then allows an estimate of the projected financial benefits of the intervention to be arrived at.

In the event that information on business-as-usual injury and ill-health incident rates are not available, then one option is to run a series of analyses assuming different levels of intervention success e.g. injury or ill-health rates reduced each year by 1 case, 5 cases, 10 cases, 50 cases, 100 cases etc. The likelihood of achieving such outcomes will obviously depend in part on the size of the workforce the intervention is rolled out across. The likelihood of realising different levels of assumed success can then be looked at more closely by decision-makers.

## Running an analysis

**The process in running an analysis using the tool can be summarised as follows:**

1. Using the MS Excel tool click on "Inputs" sheet, enter projected set-up or start-up costs (incurred in year 0) and average annual running costs (incurred each year of investment) under each of the cost categories. The tool shows example start-up costs in column D totalling £30,000 which can be over-typed.
2. Enter projected annual benefits per case of injury or ill health avoided under each of the benefit categories in the "Inputs" sheet. Use your own data or the use the "Reference HSE appraisal values" sheet as a guide (multiply unit values up by the total number of cases avoided if such projections are available).

The tool shows example annual benefits of £9000 (HSE appraisal value for one case of ill-health with 7 or more days absence - e.g. a Musculoskeletal Disorder) which is split across the five benefit categories, allowing £1800 under each category.

3. Enter an investment appraisal period (e.g. 5 years, 10 years, 20 years etc.). The tool shows 10 years as an example.
4. Click the "press here to start" button in the top right corner of the Inputs sheet.

Cost benefit analyses include a discounting factor to take account of monetary variation (e.g. inflation) over time. The default analysis uses a discount rate of 3.5%. This is regarded to be suitably conservative estimates but can be changed in the "Inputs" sheet if the user so desires.

Analysis outputs are then generated in two sheets, a summary output is generated in the "Summary Outputs" sheet (showing summary metrics only) and a more detailed output is generated in the "Outputs" sheet (also detailing cashflows for each of the years under consideration).

## Interpreting the outputs of an analysis

A Glossary of Terms is provided at the end of this document explaining key terms central to the carrying out and interpretation of a cost benefit analysis.

**The tool returns the following investment appraisal summary metrics:**

1. Net present value or NPV (£)
2. Payback period (years)
3. Return on investment or ROI (%)
4. Benefits to costs ratio
5. Internal rate of return or IRR (%).

Briefly, the net present value (NPV) expresses the net value of the investment over the investment period. It is a calculation of the difference between the total discounted stream of future costs and the total discounted stream of future benefit. The NPV can be either positive or negative depending on whether the investment breaks even by the end of the investment period.

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In the event that the NPV is positive, the payback period indicates the specific year in which the investment breaks even. In the more detailed "Output" sheet, negative cumulative cashflows are coloured red, whilst positive cumulative cashflows are coloured green. The year in which the investment breaks even (if indeed it does), then coincides with the change in colour of the cashflows from red to green.

The return on investment (or ROI) expresses the net benefits of an investment (i.e. the net present value) as a percentage of its total discounted stream of future costs. The benefit to cost ratio is a related metric to the ROI that expresses the total discounted stream of future benefits of an investment as a ratio of the total discounted stream of future costs.

The final investment metric calculated by the tool is the internal rate of return (or IRR) of the investment, which provides another way of evaluating the financial attractiveness of an investment. The IRR is the interest rate at which the net present value calculated for the investment would be zero. Expressed another way, it is the interest earned on each pound invested in the intervention for the period that it is invested. From a purely financial point of view, if the IRR is little more than the interest that could be earned by the same money being invested as cash then, based on finance alone, it would make little sense to go ahead with the investment. Inevitably, other factors will also play a part in deciding on the merits of a health and safety investment.

The "Outputs" sheet details the input data (i.e. the costs data, benefits data and interest rates) entered by the user for use in the analysis. The sheet also provides both the non-discounted and discounted cashflows for each year of the investment period, along with the discount factors used in their calculation.

### Cost benefit analysis glossary of terms

**Net present value:** The sum of the present values of the individual discounted cash flows (both incoming and outgoing) over the duration of an investment (e.g. health and safety project)

**Discounting:** A procedure that allows a comparison between costs and benefits arising in different time periods; it is conventional practice in a cost-benefit analysis to (a) choose an appraisal period (e.g. 10 years) and (b) discount the values of all costs and benefits arising each year to the first year of the appraisal period, before comparing them.

The principal behind discounting is that normally people prefer to receive benefits sooner rather than later, and prefer to incur costs later rather than sooner. In line with this, more weight is given to earlier costs and benefits than later ones by applying a discount rate.

**Discount rate:** The rate used to discount future cash flows to their present value. Within government, a rate of 3.5% is applied to appraise public policy projects. However, businesses may have their own private discount rate relating to their costs of capital that may be more appropriate.

**Return on investment:** Expresses the net benefits of an investment (i.e. the net present value) as a percentage of its total discounted stream of future costs.

**Internal rate of return:** The discount rate at which the net present value of an investment is equal to the initial investment (i.e. rate at which an investment breaks even).

**Discounted payback period:** The time taken for an investment to break even based on its cumulative discounted cash flows.

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