

PREVENTION AND PERFORMANCE

**AN ECONOMIC APPROACH
TO PREVENTION**

Environment
Economy
Training
Certification
Logistics
Innovation
OPERATIONAL
Excellence
Management
PROFITABILITY
Competitiveness
Investment
Assessment
Return
Anticipation
Efficiency
Evaluation
Quality
Productivity
Organisation
METHODOLOGY

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OPPBTPL is the French Professional Agency for Risk Prevention in Building and Civil Engineering (BCE). Its mission is to advise, train and inform companies in this sector on the prevention of work-related accidents and occupational safety, and improve working conditions.

Thanks to its network of 340 members across 18 agencies in France, OPPBTPL supports companies in risk analysis within their profession, with a complete documentation offer, and in implementing training plans.

OPPBTPL offers companies services and training courses tailored to their needs. Its website www.preventionbtp.fr offers various publications, practical tools and guidance sheets readily available to help companies in their risk prevention management. www.preventionbtp.fr



Specialized in economic and environmental analysis, AVYSO offers to apply methodology as a follow-on from OPPBTPL to companies wishing to make an economic assessment of their risk prevention policy and foster the best practices. www.avyso.com



EDITORIAL

Committed to prevention and performance

Risk prevention plays a major role in improving health and safety in the workplace. In Building & Civil Engineering, as in most sectors, striving for operational excellence is essential to competitiveness and risk prevention is key to improving global performance.

Faced with a more complex, ever-changing market, it is vital for companies to anticipate this evolution, reconsidering organization and operational modes, adapting tools as well as materials and reconsidering their uses to improve performance. Whether by investing in equipment, training or skills, setting up new construction and industrial processes, or opting for the adequate materials, risk prevention is an integral part of these measures. But how can one then assess the positive impacts of prevention on company performance?

This is what OPPBTP has been actively working on since 2010. Rather than presenting arguments based only on its own intuitions, the agency is involved in a larger effort to measure and analyze the links between economic performance and prevention, through a network of **30 methodologically-trained advisors** spread across the territory.

More than **180 cases** from 86 volunteering companies have thus been carefully analyzed on site, based on various economic, human and prevention factors. With the same result, year after year: **'Yes, prevention does pay off!'**

More precisely, in studied cases, 1 euro invested in a single prevention measure yields an average economic gain of **2.34 euros**.

Although risk prevention must not be analysed solely according to its economic aspects (which is not this study's ambition or role), we are however convinced that prevention is essential to improving company performance as well as increasing operational excellence and competitiveness.

This belief, which plays a major part in setting OPPBTP's course for the future, is already shared and held by French social partners and the CNAMTS (the French National Health Insurance Union), as well as by many European and international workplace health services. In France, this shift is visible as Return on Prevention (ROP) is now part of the third "*Plan de Santé au Travail*" (Occupational Health Plan).

This is attested here by our case study.



**Bénédicte
LEGRAND-JUNG**

Assistant director of labor conditions
and workplace health & safety,
DGT (French General Board of Labour)

*"The occupational health plan promotes
prevention and healthy workplace
conditions as factors of economic
performance."*

Prévention BTP, n° 195, March 2016



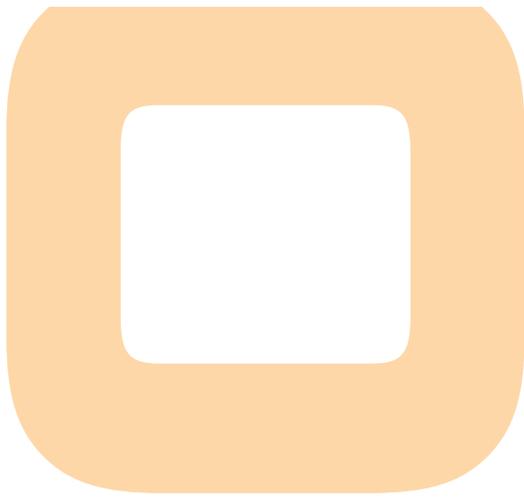
Marine JEANTET

Occupational risk manager,
CNAMTS

*"I would like to develop measures
like OPPBTP has done, to show that
investing in prevention is profitable
(...). It is a key argument in convincing
companies to invest in a prevention
process."*

Prévention BTP, n° 190, October 2015

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ASSESSING THE LINK BETWEEN PREVENTION AND PERFORMANCE

Preventing occupational risks is an absolute necessity in BCE: the physical dimension of the works involved means that danger is everywhere. Protecting the health and safety of the women and men on our work sites is first and foremost an ethical and social requirement. It is also a clearly labelled regulatory requirement – governments ensuring that a strict and comprehensive framework is in place within the Labour Code because of the high risks entailed.

However, in many BCE companies, management and employees alike consider prevention as a net cost to the company and regulations a constraint. Added to this is the feeling that ensuring employees' health and safety comes from an external demand – making it seem like investing at a loss rather than a reasoned, profitable choice for the company and its employees.

Given these preconceptions, how can companies and their employees be convinced to act together and foster a positive approach to prevention?

When prevention is perceived as incompatible with profitability, it conflicts with performance in the business sector where economic necessities are unavoidable. It is thus essential to study the link between prevention and a company's economic performance.

The usual economic arguments put forward in favour of prevention are almost exclusively based on costs: those avoided on potential accidents and those reduced, for instance on absenteeism. These arguments make a point, whether referring to the decrease in WA/OH contributions (workplace accidents/occupational health), or to the measures aiming to reduce the number of off-work BCE employees, estimated to be more than 35,000 every day on average.

But this cost-avoidance approach is not enough to engage all companies in prevention.

OPPBTB has thus opted to go beyond, by addressing the global performance of companies and examining in detail the positive economic factors derived from prevention measures.



“ Aurore PHILLIPPI

HSE manager, Berthold SA, dealing in steel frames, concrete and metal works

“As a prevention action, our production foreman decided to make floor markings delimiting the bridge crane's range: it was a real improvement. [...] This step made me more aware of the truly positive impact of improving our production facilities – you could say prevention really pays off!”

▶ www.preventionbtp.fr, 'Videos & films' tab



“ Jérôme JOUIN

Manager, Cacor construction company, specialized in masonry, frameworks, roofing and zinc work

“We decided to buy a rotating forklift truck [...]. Now employees hardly take any risks anymore - it's been a real improvement factor. [...] I didn't realize investing in this tool would have such a significant impact on both the company and the employees.”

▶ www.preventionbtp.fr, 'Videos & films' tab

Ever since this study started in 2010, this economic evaluation approach towards prevention measures has become an integral part of the goals set by OPPBTP.

It has grown to gather part of its resources around promoting this change in prevention culture and expanding it on the field. As evidence of this long-term commitment, **180 cases** from **86 volunteering companies** are now presented on the www.preventionbtp.fr website.

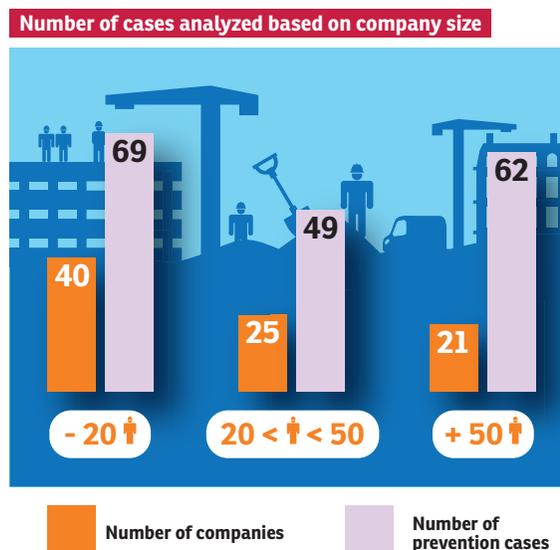
Furthermore, in France and abroad, and through a dedicated action-learning approach, OPPBTP trains big-business prevention managers, consultants and prevention specialists who then join existing advisors and contribute to enhancing the database.

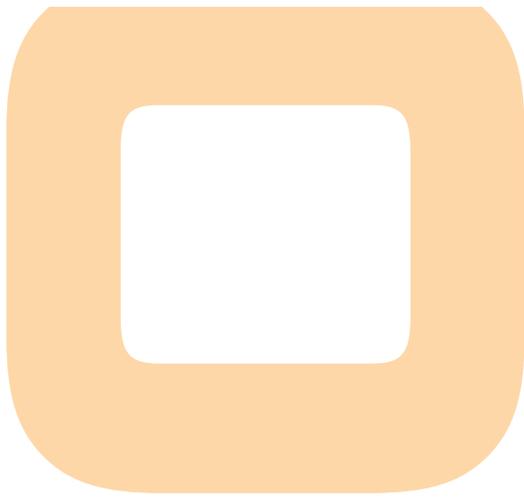
The method used is unique in its sector. It was developed with the help of an accounting firm.

The general principles of this study are as follows:

- each case is classified according to the company (size, specialization...), the type of action set in place (organization, technical, human) and the risk involved (chemicals, road hazards, MSDs...);

- an economic analysis of each action is then made, based on a before/after examination of all positions impacted by the action in question. Likewise, a prevention assessment highlights and details the results obtained in prevention (risks eliminated or reduced).





PREVENTION: A FACTOR OF ECONOMIC PERFORMANCE

We initially focused on assessing the impacts of measures undertaken in each studied case on prevention itself. These were categorized according to four criteria:

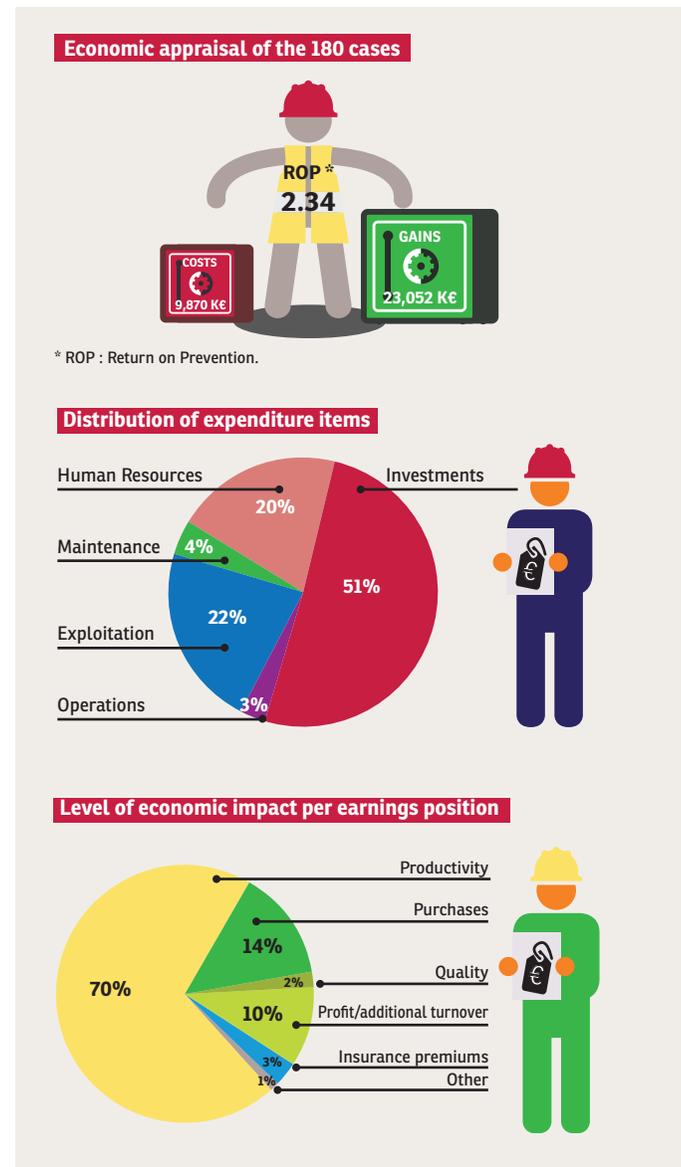
- the level of physical safety prevention, i.e. the ability to prevent an accident that could alter an employee's physical capacities;
- the level of health prevention, i.e. the ability to prevent alterations in an employee's health – this involves delayed hazards that could lead to an occupational disease;
- the level of stress-and-strain prevention;
- the level of personal development brought to each employee involved.

The prevention-based analysis of studied cases is excellent, with risks either eliminated or significantly reduced in 80% of cases. This can be explained by the quality of the sample and the determination to review these actions' impact on risk prevention before considering them from an economic point of view.

An unequivocal return on investment

In the majority of studied cases, we were able to measure the effective economic impact of the prevention action undertaken.

The net impact was positive in over 90% of cases. When it wasn't, a profit was well and truly generated and covered a great part of the costs.



In order to level out the differences in values (the sums in question ranged from €100 to €600,000), we chose a relative indicator: the return on prevention, i.e. profits over costs.

The 180 actions reviewed yielded a global profit of **2.34**: for every €100 spent on a prevention measure, economic gains thus amounted to €234 !

Prevention contributes to operational excellence

The benefits we observed were found around the major pillars of a company's operational excellence.

Productivity: safer working conditions brought with them greater efficiency of worked hours in more than **70%** of the gains assessed.

Purchases: better resource exploitation on this key item enabled increases of up to **14%** of gains.

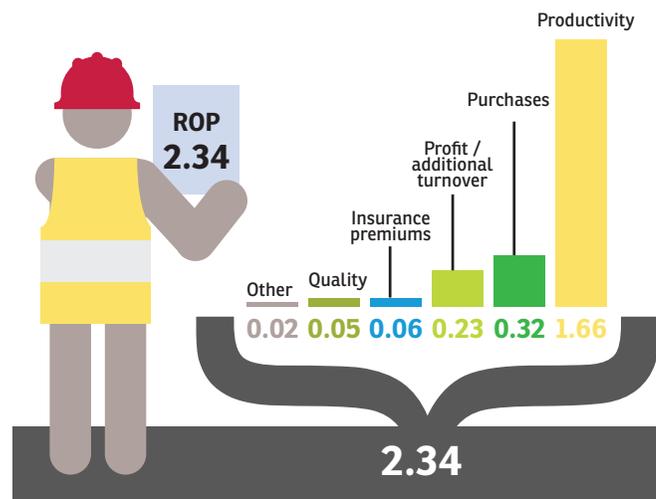
Quality: **80%** of gains in actions reviewed were related to quality, although they could not always be estimated.

Profit: this new range of cases reinforces the results of our first analysis – 10% of gains come from an improved turnover due to additional activities derived from these measures.

Companies reallocated these benefits according to their situation: towards **recruitment**, **investment**, maintaining **profit** and **competitiveness** in the face of a global raise in costs.

Benefits outside of productivity represent a ROP (return on prevention) of 0.68, which means that aside from the time saved, benefits cover over 2/3 of prevention spendings (see chart below).

Composition of ROP ratio



Prevention is within everyone's reach

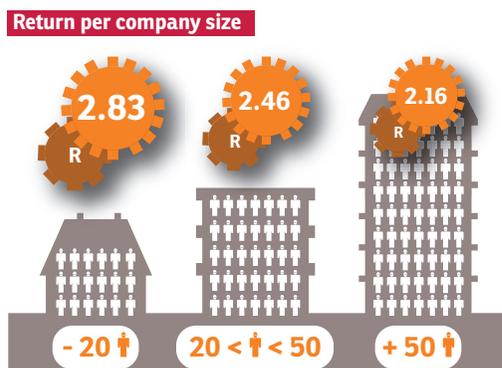
Prevention is accessible

The new actions reviewed are less costly in nature than those from the original sample. Indeed, the average cost of measures studied is of €28,000, as opposed to €78,000 in the initial sample.

Although investment per VSC employee is superior to that of an SME employee, the result per year and per employee is higher in VSCs than in those SMEs, with an average of €2,291 for the former as opposed to €1,821 for the latter.

VSCs have even more to gain

These companies have understood this, as in our sample, they yielded a return on prevention (ROP) of 2.83, against 2.16 for companies with over 50 employees.



Cash flow is balanced

The average payback time, corresponding to the time needed to cover the costs through benefits generated, remains stable at 1.5 year.

This short timeframe enables funds to be spent without straining cash flow during difficult financial times.

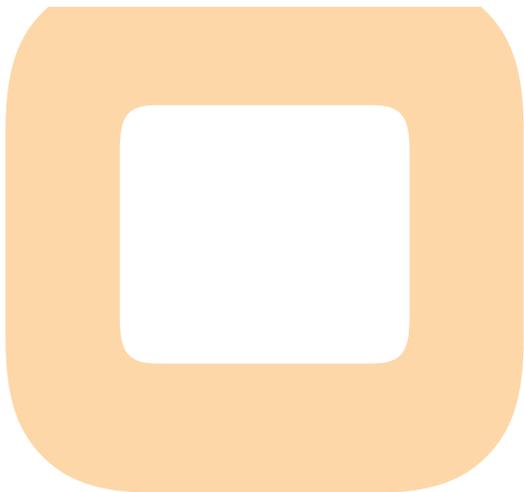
Gains

70% of benefits may come from productivity (the integral use of which is sometimes difficult to guarantee), but the remaining 30% allow 2/3 of prevention expenditures to be covered.

Return based on action type



Although the essence of prevention is to act against hazards, its implementation is also to the company's financial benefit.



CASES: TEMPLATES FOR ACTION

To illustrate these statements, we have selected three cases representing the actions undertaken by companies: an organization action, a technical action and a training action.

Each case comes in the form of a sheet. The elements collected on site are classified under four tabs.

The calculation method, devised with an engineer and economist, was validated by the managers of the companies involved in each reviewed case.

Key case elements

The first tab describes the action, the situation before and after, the employees involved in that action, the return obtained.

Case analysis

The second tab explains the significant points of the action undertaken.

Prevention analysis

The third tab assesses prevention results according to 4 main axes: physical safety, health/hygiene, reduction of stress and strain, and personal development. These axes are evaluated on a scale of 0 to 3 (3 being the total suppression of the hazard, 2 for a significant reduction of the risk, 1 for a light reduction, 0 for no impact). Two complimentary axes (sustainable development and quality) relate to corporate social and environmental accountability.

Economic analysis

The fourth tab comes in the form of a balance sheet of costs and benefits, in single or detailed view.

The key elements of this report are:

- the period over which the action is analyzed;
- the number of employees concerned by the action;
- the return, defined as the benefit/cost ratio;
- the payback time, corresponding to the time needed to cover costs through generated gains;
- the analysis per employee and per year;
- the savings achieved, defined by the benefit/cost ratio.

To consult or download cases on www.preventionbtp.fr, refer to the “Documentation” section then choose the “Prevention et performance” filter. You can then refine the search by selecting a trade, a type of action, etc. The results are displayed in a dynamic way.



Surveying with a network detector



Prevention measure

Setting up a new methodology for surveying underground networks, thanks to specific detection equipment completing the geo-tracking system of operators concerned.

Action type: Adopting new operating modes

Key case points

Company

Main activity: Electricity

Staff concerned: 2 people

This power company of 48 employees deals first and foremost in constructing electric networks and telecommunication. It has been offering services in general electricity and civil engineering since 1958.

Situation

Risks faced: Falling from a height • Electric hazards • Public roadway hazards

Before

- Geo-tracking the underground network would be done before infilling. The operator thus had to journey to construction sites several times as trenches could not be left open across their entire length.
- The site foreman had to depend on the operator and thus would also lose time.
- Networks would shift slightly during infilling periods, leading to some measurements taken beforehand being off.

After

- Now, the operator, helped by the site foreman, makes his plot in one go by positioning himself on an infilled trench.
- The detector gives a more accurate reading of the depth of the network fixed by infilling.
- The site foreman does not depend on the geo-referencing operator to open or close his trenches anymore.

Results

Reduction of road hazards, electrical risks and risks of falling.

Economic results:

- Time-saving (2.5h/km) for site managers: journeys are reduced by 15,000 km per year
- Raise in operation costs: although the task is managed by 2 people, costs are balanced by a reduced driving time (- 242 hours)

RETURN = GAIN / COST	1.99
Payback time	0.7 year
Result per employee and per year	€3,519

Prevention results:

- Reduction of road hazards
- Removal of risks of falling from heights: operating on closed trenches as opposed to open trenches
- Electrical hazards from setting up power grids reduced thanks to precise geo-referencing
- Reduction of stress: the operator is less in demand by the site foreman
- Personal development increased through training in how to use the detector

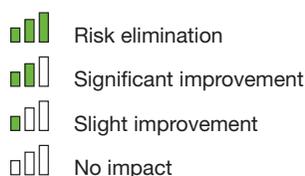
Case analysis

The methodology for surveying underground networks was modified. Measurements are now made in closed trenches when they used to be made in open ones. This operation was made possible with the help of the company's main clients, who included the detector in the procedure for geo-referencing networks. The process was carried out in two phases:

- 1. Initial phase.** The initial investment involved buying a network detector costing €4,832. This operation was analyzed over the course of 5 years because of the battery's lifespan.
- 2. Operating phase.** The company builds every year on average 60km of networks affected by this action, using a 2-person team. Its cost price is of €50.38 per hour.

.../...

Prevention result



PREVENTION LINES	IMPACT
Physical safety	
Health and hygiene	
Reduction of strain	
Personal development	
SOCIAL ACCOUNTABILITY	IMPACT
Sustainable development	Yes
Quality	Yes

Economic result

Period considered: 5 years. Employees concerned: 2

COSTS	
Investments	€6,182
■ Detector purchase	€4,832
■ Cost of tests and authorization	€1,350
<i>2 operators trained + round trip to authorization site + hotel + meal</i>	
Training	€697
■ Cost of detector training	€697
<i>€600 of training costs + cost of 4 hours spent in training</i>	
Operation	€26,140
■ Additional cost due to geo-referencing time	€26,140
<i>Before, the geo-referencer would work alone – now he is aided by the site foreman</i>	
Maintenance	€1,980
■ Cost of detector maintenance	€1,980
<i>€300/year machine standardization + €229/year for battery over 5 years</i>	
Additional human costs	€500
■ Reviewing, research and decision-making	€500
Other	–
TOTAL COSTS	€35,499

GAINS	
Production	€48,935
■ Time saved on journeys	€29,330
<i>15,000 km saved per year for an average of 62km/h as read on the vehicle meter</i>	
■ Time saved by not having to wait for geo-referencer	€19,605
<i>According to the site foreman, waiting for the geo-referencer to come measure the networks' position before infilling would amount to a total time loss of 2.5h/km for the whole team.</i>	
Purchases	€21,750
■ Yearly cost of vehicle	€21,750
<i>15,000 km saved per year, amounting to an average cost of €0.29/km</i>	
TOTAL GAINS	€70,685

RETURN = GAIN / COST	1.99
Payback time	0.7 year
Result per employee and per year	€3,519
Savings = Gain / Cost	€35,186



Electric vibratory screen



Prevention action

Investment in an electric vibratory screen to eliminate manual screening.

Action type: Purchasing machines or equipment

Key case points

Company

Main activity: Masonry

Staff concerned: 2 people

The company was founded in 2009 and specializes in artisanal masonry. It makes stone walls, floor coverings, traditional lime or hemp coatings and earthworks. It builds solid stone and terra-cotta floorings and creates plasterboards as well as traditional gypsum.

Situation

Risk faced: Muscle/joint damage (lumbago, MSDs)

Before	After
<ul style="list-style-type: none"> Workers would manually sift 1m³ of humid 0.4mm sand over 8 hours, for a result of 800 litres of conditioned materials in a 'big bag'. 	<ul style="list-style-type: none"> The company now has dry sand: it will have dried under a shed after being spread with a forklift truck. Workers mechanically sieve 8m³ of dry 0.4mm sand over 20 hours for a result of 860 l/m³ of material. 60 litres of additional sand fines are recovered, which helps obtain a sand that is more balanced, with a more homogeneous grain size.

Results

Improvement of working conditions.

- Screening is now done mechanically, leading to a significant drop in MSDs among employees.
- Time saved:** Thanks to the vibratory sieve, employees now perform the task 4 times as quickly.
- Financial gain:** Workforce costs are 4 times as cheap. Risks of cracking are reduced thanks to the improved quality of the sand obtained.

RETURN = GAIN / COST	3.87
Payback time	0.5 year
Result per employee and per year	€684

Case analysis

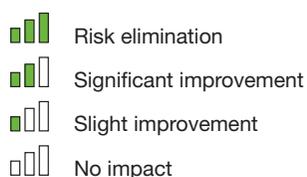
The company decided to get a vibratory screen to improve working conditions for the employees concerned and reduce the risks of MSDs by eliminating manual sifting.

Moreover, the sifted sand's quality is improved: it is finer, more balanced, and the coating obtained thus more adhesive, with a mechanical coherence.

This purchase demanded an investment of €670, but led to over a production gain of €5,544 over 3 years. Indeed, although sand must be dried beforehand, the sifting prices is completed mechanically, 4 times as quickly, for a production cost of €281.

.../...

Prevention result



Workers are not submitted to the strain of manual sifting anymore, leading to fewer MSDs.

PREVENTION LINES	IMPACT
Physical safety	
Health and hygiene	
Reduction of strain	
Personal development	
SOCIAL ACCOUNTABILITY	IMPACT
Sustainable development	No
Quality	Yes

Economic result

Period considered: 3 years. **Staff concerned:** 2 people

COSTS	
Investments	€670
■ Purchase of vibratory screening machine	€670
Operation	€281
■ Use of forklift truck for drying process	€113
<i>2 hours of telescopic forklifting to spread the sand.</i>	
■ Drying period	€168
<i>2 hours of workforce per year to spread the sand with the forklift truck.</i>	
Maintenance	€321
■ Equipment maintenance for a year	€84
<i>1 hour of maintenance by 1 worker once a year at €28/h.</i>	
■ Purchase of screens	€57
<i>Screens must be renewed twice a year, whereas before the screen used to be changed once every 10 years</i>	
■ Silent blocs on vibratory sieve holder	€180
<i>Two €30 silent blocs to be replaced every year.</i>	
Additional human resources	€160
■ Research on equipment to use	€160
<i>4 hours of research to find adequate equipment at a rate of €40/h.</i>	
TOTAL COSTS	€1,432

GAINS	
Production	€5,544
■ Mechanical screening operation	€5,544
<i>Screening time is now of 2.5h/m³ (€25/h) instead of the 8 h/m³ it used to take</i>	
TOTAL GAINS	€5,544

RETURN = GAIN / COST	3.87
Payback time	0.5 year
Result per employee and per year	€685
Savings made = Gain / Cost	€4,113

For this report, to be cautious and after checking with other masons, we noted a manual screening time of 8h per m³ of sand, whereas the head of the company estimated it up to 12h/m³. Furthermore, we limited the action period to 3 years. The amount of screened sand is of 12 m³ per year. The director of the company specified the manual sieve used to be changed every 12 years. We could have retained, as the director suggested, a period of 5 years for the use of this screen and a manual screen time of 12h/m³, which would have resulted in a more favorable return of up to 8.



Training of an employee in B2V BR electrical certification



Prevention action

With an initial training in electromechanics, this employee was trained in 'B2V BR' electrical certification for connecting electric appliances and installing electrical protection panels inside cabinets.

As a reminder, training courses for electrical certification only involve getting to know the risks linked to electricity and differ from an actual professional electrician training. To be able to get the 'B2V BR' certification, one must already have followed a professional training course in electricity and be allowed to lead electrical works.

Action type: training, service, raising awareness

Key case points

Company

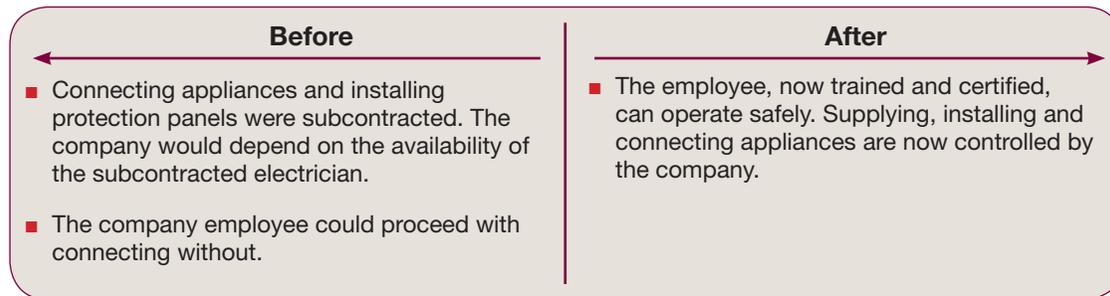
Main activity: Plumbing / Heating / Ventilation

Staff concerned: 1 employee

This company of 20 employees is specialized in selling and installing heating systems. It has opened its business to renewable energy, and offers thermal studies as well as energy diagnostics. It sets up geothermal and aérothermal heat pumps, reversible systems, underfloor heating and cooling systems, single/double-flow ventilation systems, airconditioners, etc.

Situation

Risks concerned: Electrical risks



Results

Reduction of electrical hazard.

Prevention results:

- Restriction of electrical risk.
- Compliance with regulations.
- Connection services covered and guaranteed.

Economic results:

- More autonomy and adaptability.

RETURN = GAIN / COST	2.05
Payback time	0.2 year
Result per employee and per year	€6,847

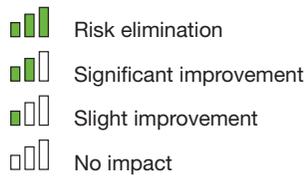
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Case analysis

This company would call on a sub-contractor to connect and install electrical protection panels, heating systems and renewable energies. It decided to train one of its employees in electrical certification, so as to be freed from the uncertainties of outsourcing, to comply with the legislation and maintain control over its planning. This new control of operations also provides a better quality of service, which is highly appreciated by the clientele. On top of conforming to legislation and limiting electrical risks, financial gain is a given.

.../...

Prevention result



PREVENTION LINES	IMPACT
Physical safety	
Health and hygiene	
Reduction of strain	
Personal development	
SOCIAL ACCOUNTABILITY	IMPACT
Sustainable development	No
Quality	Yes

Economic Result

Period concerned: 3 years

Staff concerned: 1 employee

COSTS	
Investments	€120
<ul style="list-style-type: none"> ■ Specialised equipment investment for electrical connections <div style="background-color: #e0e0e0; padding: 2px; margin-top: 5px;">Purchase of insulating blankets, insulating gloves, lockout devices for circuit-breakers</div>	€120
Training	€1,151
<ul style="list-style-type: none"> ■ Cost of B2V BR electrical certification training ■ Covered by Constructys ■ Cost of employee's non-production time during training <div style="background-color: #e0e0e0; padding: 2px; margin-top: 5px;">3 days of training</div>	€800 - €516 €867
Operation	—
Maintenance	—
Additional human resources	€18,207
<ul style="list-style-type: none"> ■ Labour for equipment connections <div style="background-color: #e0e0e0; padding: 2px; margin-top: 5px;">Time spent by worker connecting equipment, i.e. 10% of their overall activity time: €6,069/year x 3</div>	€18,207
Other	—
TOTAL COSTS	€19,478

GAINS	
Production	€7,020
<ul style="list-style-type: none"> ■ Additional cost linked to subcontracting <div style="background-color: #e0e0e0; padding: 2px; margin-top: 5px;">One person had to accompany the subcontractor</div> <ul style="list-style-type: none"> ■ Administration cost linked to subcontracting <div style="background-color: #e0e0e0; padding: 2px; margin-top: 5px;">Management of subcontracting records by secretary</div>	€6,000 €1,020
Purchases	€33,000
<ul style="list-style-type: none"> ■ Cost of subcontracting services 	€33,000
Quality	—
Profit / Additional turnover	—
Insurance premiums	—
Other	—
TOTAL GAINS	€40,020

RETURN = GAIN / COST	2.05
Payback time	0.2 year
Result per employee and per year	€6,847
Savings made = Gains - Cost	€20,542

- Low impact on turnover and new market acquisition.
- No additional cost on biennial civil liability insurance.

We would especially like to thank
the companies which provided us with the data
required for our study.

ALLUT BONNEAU BÂTISSEURS, 36300 Ciron • ALTIBOIS
CONSTRUCTION, 74570 Groisy • ANOSTE BOIS, 40510
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