HEALTH AND SAFETY AUTHORITY

Ergonomics

Good Practice in the Irish Workplace

Our vision:

A country where worker safety, health and welfare and the safe management of chemicals are central to successful enterprise

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Introduction

This publication demonstrates how companies introduced a range of engineering and organisational improvements in the way work is carried out to avoid or reduce the risk of musculoskeletal injury. According to the European Union in a Council Recommendation that they published in 2013, member states need to develop and strengthen legislative measures to minimise exposure to risk factors originated by poor ergonomic conditions in the workplace and ensure the effectiveness of these measures by providing adequate instruments and resources to implement and enforce them.

This publication describes a range of measures that companies can consider to minimise exposure of their workforce to poor ergonomic conditions. It outlines examples of other benefits in addressing poor ergonomic conditions in the workplace including productivity improvements, employee involvement, increased innovation and team work and a high level of management commitment.

The efforts put in place by all five companies demonstrate a commitment to Ergonomic risk Management in the workplace.

Ergonomics Risk Management

Ergonomics is the relationship between the worker and the job and focuses on the design of work areas or work tasks to improve job performance.

In essence the effective management of ergonomics at workplace level depends on a number of key factors including:

- Knowledge of the nature of work carried out in the workplace
- Knowledge of the potential ergonomic risks in the workplace
- Competency in the application of appropriate risk assessment tools to quantify ergonomic risk
- Competency in the development of innovative engineering or organisational interventions to manage ergonomic risk
- Effective communication and consultation processes in order to implement appropriate changes in work practices
- Effective training and development processes
- Management commitment to address Ergonomic risk and provide the required resources

The most effective way for an employer to demonstrate that they are serious about addressing ergonomic risk in the workplace is by ensuring that they do the following:

- Develop a policy which explains how the organisation will manage ergonomic risk in the workplace; this can be a short policy and an example can be found in the Health and Safety Authority Guide on the Prevention and Management of Musculoskeletal Disorders in the Workplace.

- Complete task specific risk assessments of work activities in order to identify potential ergonomic risk factors and appropriate control measures to avoid or reduce poor ergonomic conditions in the workplace. There are a number of risk assessment methods that can be used including the Health and Safety Executive Mac Tool which can be used in association with the five step model developed by the Health and Safety Authority.
- Implement the appropriate task specific control measures (e.g. Use of vacuum handling equipment for handling heavy bags) which clearly address the identified ergonomic risk factors that were identified in the task specific risk assessments.
- Develop a safe system of work plan as a useful way of demonstrating and documenting the interventions that have been put in place.
- Provide appropriate training to the workers so that they understand what changes have been put in place, how the changes will address ergonomic risk and how they should carry out the task using the appropriate equipment provided or in line with the relevant Safe System of work plan.

Benefits of Ergonomics Risk Management

The case studies in this publication demonstrate that there are a number of tangible benefits that have resulted from the implementation of engineering and organisational interventions to address ergonomic risk factors in the workplace. It is worthwhile outlining some of the benefits that have resulted:

- Reduced risk of occupational injury or illness
- Innovation and creative thinking
- Effective team work and consultation
- Effective communication at all stages of the project
- Evidence of productivity and efficiency improvement
- Reduced lost days due to occupational injury or ill health
- Evidence of management commitment and investment
- Evidence of a return on Investment
- Evidence of increased knowledge and awareness of Ergonomics

Case Studies of Ergonomic Good Practice in Ireland

Each of the case studies uses the same structure to outline the work completed to address Ergonomic risk in the workplace, the main headings in the case studies are:

- The Company
- The Process
- Stage 1: Problem Identification
- Stage 2: Problem Solving Process
- Stage 3: Outcome
- Stage 4: Results
- Recap on Results
- The Team Involved

The case studies are detailed overleaf.

Case Study

John Crane (Ireland) Ltd.

Company: John Crane (Ireland), Ltd.

Address: Shannon Free Zone, Bay 53/54, Shannon, Co. Clare V14 YC90

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Contact: Seamus@johncranesealol.com

The Company

John Crane (Ireland) Ltd is a global leader in engineered technology, supplying a variety of products and services to the energy and other major process industries. The company's Irish facility is based in Shannon, and is in its 40th year of operation.

The Process

John Crane (Ireland) Ltd is the premier manufacturer of edge welded metal bellows seals used in the Oil Extraction, Refining, Refrigeration, Chemical and Process industries. The production process involves Plate Stamping, CNC Machining, Metal Bellows Welding (micro T.I.G.) and Seal Assembly.

Stage 1: Problem Identification

Description of Task

The specific task relates to the edge-welded metal bellows seals, which are mainly found in pumps and compressors, and prevent the medium being driven from leaking into the outside world. The current Case Study is focused on the loading of metal billets into the CNC machine. Previous to ergonomic risk management, the undrilled metal billets were brought on a workshop trolley to be loaded into CNC machine. The billet was then transferred manually from the trolley to the stage table, to accommodate the difference in height from trolley to table. It was then manually lifted from the table into the CNC machine.

Risk Reduction Reason

The assessment highlighted an unacceptable risk of back injury when lifting, reaching, loading and unloading the metal billets which can weigh 20-130kg.

Evidence of Risk Factors

The risk factors related to:

- Force: the weight of the billets (typical weight being 20-130kg) – the billets were in excess of the recommended safe levels for manual handling, certainly too heavy for one person to lift manually.
- Posture: twisting, heavy lifting, extended reach because load had to be held at a distance from the truck.

The team involved are (L to R), Eddie Mulvihill, Seamus O'Sullivan and Darrin Gardiner.

Stage 2: Problem Solving Process

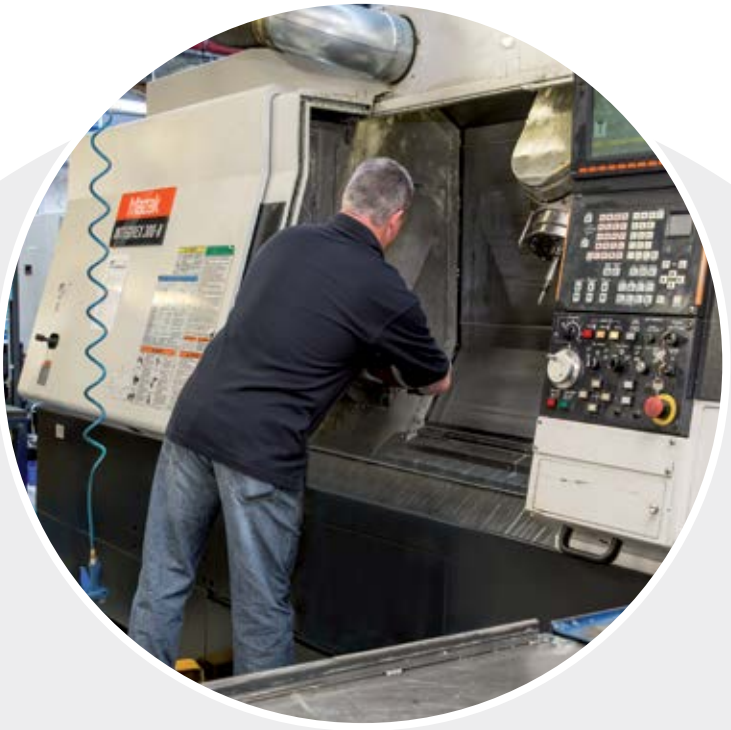
What Was Done?

Conventional gantry style lifting devices could not be used because of overhead restrictions, so a floor based articulated arm was developed. The primary concept was developed in-house by the Maintenance department in conjunction with the machine operators and Environmental Health & Safety (EHS). Additional refinements were subsequently added by the fabricator.

Before: Operator manually lifts the billet from the staging table

What were the Objectives?

The objective was to pick the billet from the loading bench, place it in the centre of the CNC chuck ready for clamping, and remove the remaining butt, once processing was completed in order to eliminate the risk factors resulting from the manual handling of the billets.



Before: Operator manually transfers the billet into the CNC machine

Evidence of Risk Factors

The risk factors related to:

Force: the weight of the billets (typical weight being 20-130kg) – the billets were in excess of the recommended safe levels for manual handling, certainly too heavy for one person to lift manually.

Posture: twisting, heavy lifting, extended reach because load had to be held at a distance from the truck.

Case Study (Cont'd)

John Crane (Ireland) Ltd.

Risk Assessment Tools

The Risk Assessment Tool used was the Health & Safety Authority five step Manual Handling Risk Assessment Process. The company used video to inform group discussion particularly around Step 2. The team collectively viewed the process to understand what was going on and where the solution might lie.

Problem Solving Activities

The main activities undertaken were:

- Observation of the process and discussion of difficulties and risks with the operators
- A measurement of physical properties involved, (weight, height, reach distance).
- A video capture of coping behaviours and analysis of the issues. To do this piece of work, two different operators completed the task while the EHS&E Manager walked around them recording the available space, posture and handling activities at critical stages. He used a hand-held Panasonic Lumix DMC-TZ7 camera shooting 1280 X 720 images at 30 fps.
- A provisional scope-out of possible solutions was conducted.
- A discussion of the proposal was held with operators and the proposal was finally revised.
- Engineering dimensions, drawings and cost discussions with the fabricator took place.
- Finally, the quotation was approved and we finalised and installed the custom billet loader.

Stage 3: Outcome

Agreed Changes Recommended

A custom engineered billet loader was fixed to the floor at each CNC machine centre, and all operators were trained to use it. The units were added to the preventive maintenance system for periodic integrity check.

The Main Interventions

The Purchasing Department arranged for the material vendor to supply any billets over 6 inches in diameter with a 1 inch hole drilled into the centre. This is to facilitate pick-up by the prong on the billet loader.

Cost of Intervention

Each billet loader cost €600 to manufacture, (fitting was done by in-house maintenance personnel). A scissors table costing €200 was also installed at each machine to facilitate loading different diameter bars to the fixed height loader. The total once-off cost was €800 per machine. A recurring cost of €6 per billet must also be absorbed into the direct cost of material.

Stage 4: Results

Results

A custom engineered billet loader was fixed to the floor at each CNC machine centre, and all operators were trained to use it. Since the intervention, the risk of injury to operators while loading and unloading metal billets has been significantly reduced. Also, the risk of injury to operators from pulling the previously used cart-mounted jacking apparatus is completely eliminated. Finally, the risk of injury to service engineers who occasionally change chucks is also greatly reduced.

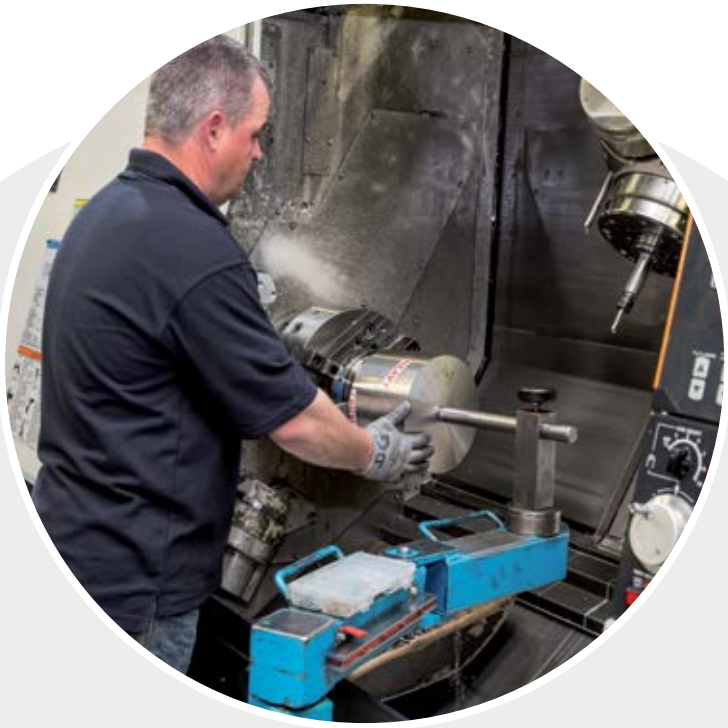
After: Operator uses custom engineered billet loader to transfer billet to CNC machine

Recap on Results

Health benefits (e.g. risk factors like force, repetition, posture eliminated or reduced)

There are three main health benefits:

- The risk of injury to operators while loading and unloading metal billets has been significantly reduced as the operators no longer manually lift the billets at any stage of the process.
- The risk of injury to operators from pulling the previously used cart-mounted jacking apparatus is completely eliminated.
- The risk of injury to service engineers who occasionally change chucks is also greatly reduced.



After: Operator uses custom engineered billet loader to transfer billet to CNC machine

Case Study (Cont'd)

John Crane (Ireland) Ltd.

Evidence of innovation or creative thinking?

Off-the-shelf solutions were both impractical and expensive. The innovation shown by the team at John Crane resulted in a low cost permanent solution that requires minimal maintenance and training.

Evidence of Team Work?

The broad concept came from one individual, but arrival at a working solution required input from the Engineering, Purchasing, EHS and Maintenance Departments as well as the operators themselves and the external fabricator.

Evidence of consultation and communication with those that work on this production process?

There is both video and documented evidence of consultation and communication.

Evidence of any productivity or efficiency improvements?

A billet can now be loaded and unloaded in less than 1 minute as opposed to 5 to 10 minutes with the previous system. Depending on the type of work being done, this contributes an average of 1 hour per shift of manufacturing up-time.

Evidence of reduced lost days due to accidents or ill health?

There have been no incidences of injury since the introduction of the billet loader system. Over the previous 10 years there had been 2 reportable injuries in this area.

Evidence of management commitment and investment?

Management supported this development. Four senior managers gave their time and expertise to the project and purchase orders were approved without difficulty.

Was there a return on investment?

An additional 10 hours of manufacturing time per week, per machine centre, has been made available to Production.

Evidence of increased knowledge and awareness of ergonomics?

The team are more aware of the benefits of effective ergonomic risk management in exploring opportunities to eliminate risk of injury. Operators are therefore far less likely to attempt to manually lift anything that might cause risk.

Did the introduction of changes have any positive impact on housekeeping?

The billet loaders are fixed at each station, easy to keep clean and always available. The previous system involved a heavy cart-mounted apparatus which had to be taken from its location whenever it was needed, duck-boards and fatigue matting had to be moved to get it close enough to the machine and then it had to be re-parked when not in use. This created a lot of traffic and housekeeping disruption.

Testimonial

Following observation, a discussion of difficulties and a measurement of the physical properties involved, we video captured coping behaviours and analysed the issues. Possible solutions were discussed with operators and a custom billet loader was fabricated and fixed to the floor at each CNC machine centre. All operators were then trained to use it. Since the intervention, the risk of injury to operators while loading and unloading metal billets has been significantly reduced and the risk of injury to operators from pulling the cart-mounted jacking apparatus and the operators changing chucks is completely eliminated. A billet can now be loaded and unloaded in less than a minute as opposed to 5 to 10 minutes with the previous system. This contributes an average of 1 hour per shift of manufacturing up-time, and an additional 10 hours of manufacturing time per week, per machine centre, has been made available to production. We are all delighted with the change.

Seamus O'Sullivan
EHS&E Manager,
John Crane (Ireland) Ltd.

The Team Involved

The broad concept came from one individual, but arrival at a working solution required input from the Engineering, Purchasing, EHS and Maintenance Departments as well as the operators themselves and the external fabricator. The team involved are pictured below: Darrin Gardiner, Seamus O'Sullivan and Eddie Mulvihill.

(L to R) Darrin Gardiner, Seamus O'Sullivan and Eddie Mulvihill.

Case Study

RUSAL Aughinish

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The Company

RUSAL Aughinish is the largest alumina refinery in Europe and the largest of the alumina facilities operated by UC RUSAL and based in Askeaton, Co Limerick. The plant was built between 1978 and 1983 and had an initial rated capacity of 800,000 tonnes a year. The current annual capacity of the refinery is in excess of 1.8 million tonnes of alumina. RUSAL Aughinish has always been to the forefront in terms of technology in the industry. Year after year it implements the most modern technologies available to ensure it remains one of the top alumina producers in the world.

The Process

The Bayer process is an energy-intensive technology and consumes large amounts of natural gas and energy. To satisfy the refinery's demand for energy, a 160 megawatt Combined Heat & Power Plant (CHP Plant) was built on the site of RUSAL Aughinish. Currently, the CHP Plant generates steam and power for the refinery and supplies surplus power to the national power grid. RUSAL Aughinish operates a dry disposal bauxite residue disposal area (BRDA). The Bayer Process is used to process bauxite into alumina. Alumina is a fine powder and is exported as the feedstock for aluminium smelting. The staff working in the Central Workshops are involved in many manual handling tasks. The specific task for this Case Study relates to the mechanical work aids used in the Central Workshops.

Stage 1: Problem Identification

Description of Task

In the Central Workshops, pipes with wall thickness of 2" and up to 30" diameter need welding. In the current system the pipe rests on a bench or stand and has to be lifted with slings to rotate it to the next working positions. This requires as many as 64 interruptions to welding to allow the pipe to be rotated. This is to ensure that the section being welded is in the correct position. Even so, the welder is often in an awkward position – especially on the larger pipes.

Risk Reduction Reason

The current system led to a sustained awkward posture for welders when welding pipes up to 30" diameter. Two welders had to change position repeatedly to weld the circumference of the pipe. The pipe had to then be turned numerous times, often as many as 64 rotations within a 3 day period. The welders were required to crouch, and risked burn injuries when working below the weld and also had to lean across the top of the pipes.

Evidence of Risk Factors

The risk factors included:

- Poor posture (crouching, kneeling and lifting)
- Potential for burn injury
- Reaching away from body
- Sustained awkward posture

Stage 2: Problem Solving Process

What Was Done?

The Central Workshops (CWS) mechanical team identified the problems in a risk review of workshop tasks. Initially the CWS mechanical team and their facilitator were involved.

What were the Objectives?

The objective was to eliminate the poor ergonomic posture of the welders, the exposure to burns and the manual repositioning of the pipe.

Evidence of Risk Factors

The risk factors included:

- Poor posture (crouching, kneeling and lifting)
- Potential for burn injury
- Reaching away from body
- Sustained awkward posture

Before: The Operator rotates pipe using an overhead hoist

Before: Operators carrying out welding work while maintaining awkward positions

Case Study (Cont'd)

RUSAL Aughinish

Risk Assessment Tools

Two Risk Assessment Tools were used - the RUSAL Business System 9-Step Improvement Process and Safety Conversations. The 9 Step is a systematic process promoted by RUSAL and used routinely by all teams to make improvements. Safety Conversations are a key part of the on-site Safety Awareness programme in place at RUSAL over the last few years to improve safety behaviour.

Everyone on site attended a day and a half long workshop. Using drama-based learning, they were taken through the root causes of accidents, why people take risks, how people differ in their view on safety and how to ask open probing questions. The culmination was coaching and practice of Safe Talks – how to engage people in effective discussion. These conversations are promoted at all levels to prompt improvements as people volunteer problems and solutions that affect them during the conversations.

Problem Solving Activities

The team brainstormed the problem and arranged a practical demonstration of the proposed solution together with a technical analysis. The practical demonstration was a trial run using the pipe rollers to see whether what seemed good as an idea would work in practice. The technical analysis means that the team checked to see whether the welding process could affect the rollers – i.e. whether the bearings for the rollers would be fused by the current drawn during welding – this is a standard check done when welding.

Stage 3: Outcome

Agreed Changes Recommended

The agreed changes were to utilise equipment (rollers) that were used for other purposes in the CWS. The rollers have:

- Adjustable wheel spacing to suit different pipe diameters
- Adjustable height
- One stand is motorized so that the pipe can be turned

It was agreed that all straight change of lengths of pipe were to be welded on the pipe roller stands. The welders were trained and instructed in the use of the new roller system including the use of its remote pendant. Familiarisation was achieved for the welders involved.

The Main Interventions

An ongoing review is in place. There were no changes to the original plan except the technical analysis of suitability to welding. New team members challenged the established way of work. An Intervention by the team was included at the design stage – i.e. checks by someone outside the team to ensure the equipment would work with welding equipment.

Cost of Intervention

There were minimal costs because the rollers were already on site and can be used for both original and new tasks. It cost €5,000 to purchase the rollers originally.

After: Rollers in position to allow operator maintain good posture while welding pipe

After: The use of the new roller system allows operators to alternate posture from standing to sitting during welding.

Case Study (Cont'd)

RUSAL Aughinish

Stage 4: Results

Results

The following ergonomic results were achieved:

- One welder can now complete the task in a single standing position and does not have to crouch or be exposed to potential burns from overhand welding.
- Welders have posture improvements.

There have been additional benefits in terms of productivity and efficiency, namely:

- There are less changeovers required.
- The weld quality is improved.
- There is an overall increased efficiency.

Recap on Results

Health benefits (e.g. risk factors like force, repetition, posture eliminated or reduced)

The interventions introduced resulted in the elimination of poor ergonomic posture, overhand welding and a potential for burn injury.

Evidence of innovation or creative thinking?

Our innovative and creative thinking was evidenced by us challenging a 30 year old practice of pipe welding in the CWS.

Evidence of Team Work?

Team Work and team communication were demonstrated through the involvement of all the fitting team members. The idea originated from the team.

Evidence of consultation and communication with those that work on this production process?

The team identified the problem and the solution. The CWS welding team were involved at all stages from the inception, through trialling, technical analysis and sign-off after the trials.

Evidence of any productivity or efficiency improvements?

This is principally a manual handling improvement. However, the overall task takes 25% less time and is now a one person job. Previously it required two welders to carry out the task.

Evidence of reduced lost days due to accidents or ill health?

No ill health issues were reported previously. However, the risks are reduced significantly and the work is more controlled and much safer.

Evidence of management commitment and investment?

Management supported this development. Funding and resources were provided. Consideration is being given to ordering more sets of rollers for different applications, with additional rollers being ordered for use in the NDE section of the workshops. (Quotations have been requested).

Was there a return on investment?

The main benefits are improved health and safety.

- There is an additional 125% increase in output. On 30% of the jobs (involving the smaller pipes) the previous 2 people required to work on the welding is reduced to 1 (18% increase in productivity).

Testimonial

This is a prime demonstration of increased knowledge and awareness of ergonomics in a principally manual handling environment. In this example, we challenged a 30-year old practice of pipe welding, resulting in safety benefits. The improvement illustrates the outputs from our safety awareness programme, with learning from the manual handling training. The overall task now takes 25% less time and is now a one person job. Previously it took two welders to carry out the task and we are delighted to report an additional 125% increase in output.

Rob McLean
Safety and Security Coordinator,
RUSAL Aughinish

- There is a significant reduction in the time to complete these welding jobs by eliminating the 64 interruptions to rotate the pipe.
- Allowing some additional weld cooling time for the new continuous process, the overall time is reduced by some 50%. (100% increase in productivity).
- On average there is a 118% increase in labour productivity for this work.
- There are additional benefits such as: reducing the potential for injury during the old pipe rotation process, and releasing the overhead crane so that it can be used for other activities – with associated safety / productivity advantages.

Evidence of increased knowledge and awareness of ergonomics?

This is a prime demonstration of increased knowledge and awareness of ergonomics. This has combined the benefits from our safety awareness programme with learning from the manual handling training. Further follow up has included the introduction of stools for welders at their work stations.

Did the introduction of changes have any positive impact on housekeeping?

The job does not involve multiple changeovers to move the position of the pipe as it can now be moved with the rollers resulting in less debris on the shopfloor.

The Team Involved

All the fitting team members were involved in the intervention as the idea originated from the team. Pictured are: Frank O'Callaghan, Tom O'Sullivan, Tommy Kelly and Dean Rice (Team Facilitator).

Frank O'Callaghan, Tom O'Sullivan, Tommy Kelly and Dean Rice.

Case Study

Green Isle Foods

Company: Green Isle Foods (Longford) Ltd.
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The Company

Green Isle Foods, is a leading frozen foods manufacturing company established in 1982. Part of the 2 Sisters Food Group, Green Isle Foods Ltd is a market leader in high-quality convenience foods. The company turnover is €210 million with approx 650 people employed in Ireland. With four production sites at Naas, Portumna, Gurteen and Longford, Green Isle Foods has a number of brands such as Green Isle, Donegal Catch and Goodfella's. Quality is the watchword of the company, with all its production sites holding higher level British Retail Consortium (BRC) accreditation.

The Process

The dough is mixed, fermented and pressed in the Bakery Department, it then travels into a gas-fired stone travelling oven where it is baked. The base then enters a blast freezer. The base travels into the topping hall where it is firstly topped with sauce, then cheese, and then various toppings such as pepperoni, ham and pineapple. The topped pizza then enters another blast freezer where the base and toppings are frozen. After leaving the freezer, the pizzas enters the Packing hall where they are shrinkwrapped, boxed and then baled and wrapped in plastic. They are then stacked onto a pallet and placed on a trailer for shipping. The current Case Study relates to the difficult lifting tasks involved in changing the Positioner heads. The Positioner is a machine that aligns the dough balls in the correct position on the conveyor before they enter the press. They need to be centred accurately on the conveyor so that the round press head lands exactly on top of the dough ball to ensure it presses into an evenly shaped pizza base.

Stage 1: Problem Identification

Risk Reduction Reason

Operators and engineers raised safety concerns about the difficult lifting tasks involved in changing the Positioner heads.

In Detail

The two Positioner heads are large and heavy. They are both approximately 1.25m wide by 1.75m long. One weighs approximately 45kg and the other weighs approximately 55kg. These heads are changed 2 to 3 times per week. The old process was to take the head from it's holding position on the wall adjacent to the line and carry it to the line and then lift it above shoulder height onto the line where it was then clipped into place on the Positioner. This task required at least three people.

Evidence of Risk Factors

The key risk factors:

- Positioner Head Load weight too heavy (between 45kg and 55kg).
- Load too bulky
- Load lifted above shoulder height

Stage 2: Problem Solving Process

What Was Done?

The engineering team looked at several off the shelf hoists to help with the process but none were fully suitable. They then looked at a bespoke lifting and holding mechanism to address the issue. The team designed a frame to sit above the line which would act as a holding station for the Positioner head when not in use and also allow the heads to be rolled in and out of the Positioner with no need for lifting. The Engineering Team and External Fabricators were involved in this stage.

Before: Team lift by three operatives to transfer Positioner Head

What were the Objectives?

The objective was to eliminate the heavy manual handling task of lifting the Positioner Heads from their holding position on the wall to the Positioner on the line.

Evidence of Risk Factors

- Positioner Head Load weight too heavy (between 45kg and 55kg).
- Load too bulky
- Load lifted above shoulder height

Risk Assessment Tools

The Risk Assessment Tool used was an in-house Risk Assessment. A team consisting of engineers, operators and Health & Safety worked together to identify the hazards and evaluate the risks. Using the hierarchy of controls it was deemed that the best solution was to eliminate the task by designing a frame for holding and moving the Positioner heads.

Problem Solving Activities

While the engineering team were coming up with a design they continuously consulted with the production team and health and safety to ensure all parties were involved. Several meetings were held to review options such as hoists, but the suggestion to build a frame above the line to hold the Positioner heads and roll them down into position underneath the Positioner was viewed by all as the best.

Case Study (Cont'd)

Green Isle Foods

Stage 3: Outcome

Agreed Changes Recommended

The new structure was fabricated and then fitted into place above the line. The heads were placed on the new framework and held in place. When the heads were needed for production the clips were released and the heads were rolled down along the framework until they sat below the Positioner ready to be clipped into the Positioner for use in production.

The Main Interventions

The main interventions were the design and fabrication of a completely new piece of equipment to hold the Positioner heads in place when not in use and to also act as a rolling system to allow the heads to be rolled down onto the line and into place.

Cost of Intervention

External Fabrication costs were approximately €7,000.

Stage 4: Results

Results

The introduction of this engineering intervention resulted in the elimination of the very heavy and awkward lifting and carrying of the large Positioner heads.

Recap on Results

Health benefits (e.g. risk factors like force, repetition, posture eliminated or reduced)

Following the introduction of this engineering intervention, the risk of exposure to injury was avoided, as there was no longer a requirement to lift the Positioner Heads.

Was there evidence of innovation or creative thinking in this project?

This was a bespoke design arising from the creative thinking and innovation of the engineering team.

Was there evidence of team work?

Several Bakery engineers, engineering manager, Bakery cell leaders and operators and the Health &Safety Manager were involved in the decision and design process.

After: Two Operatives changing Positioner Head

Was there evidence of consultation and communication with those that work on this production process?

Cell Leaders, Operators and Bakery engineers were consulted and involved in the process.

Was there evidence of any productivity or efficiency improvements?

Changeover time is considerably less now so efficiencies have improved.

Was there evidence of reduced lost days due to accidents or ill health?

The project was completed prior to any accident taking place. The project arose from the proactive reporting of safety concerns by operators and engineers who could foresee that an accident may happen.

Was there evidence of management commitment and investment in the project?

Green Isle Management fully supported the project and the board approved the capital expenditure to fund the project.

After: Operative Releases Clips to Allow the Transfer of the Positioner Head

After: Rolling System allows Positioner Head to roll onto the line

Case Study (Cont'd)

Green Isle Foods

Was there a return on investment in the project?

There was no demonstrable financial gain but the improvement in health and safety standards and the improvement in process changeovers proved a qualitative return on investment.

Was there any evidence of increased knowledge and awareness of ergonomics?

The Bakery operators and Engineers have voiced great satisfaction with the new system and the ease at which they can now change the heads.

Did the introduction of changes have any positive impact on housekeeping?

The heads are now stored above the line in a purpose built framework whereas beforehand, they were hung on a bracket on a wall beside the line.

The Team Involved

(left to right)

Gregory Carr

Mary Collins,
Health & Safety Manager

Carol Carr

Oliver Miney

Michael Fanneran

Michael Duffy

Gerry Costello

Michael Melly

Testimonial

Operators and engineers raised safety concerns about the difficult lifting tasks involved in changing the Positioner heads 2 to 3 times a week, which are large (1.25m wide by 1.75m long) and heavy (45kg – 55kg). The old process required three people to take the head from it's holding position on the wall adjacent to the line and carry it to the line and then lift it above shoulder height onto the line where it was then clipped into place on the Positioner. This was a difficult lift. The engineering team looked at several off-the-shelf hoists but none were fully suitable, so the team designed a bespoke frame to sit above the line to allow the heads to be rolled in and out of the Positioner and act as a holding station when not in use. The cost of the fabrication was approximately €7,000. This engineering intervention resulted in the elimination of the very heavy and awkward lifting and carrying of the large Positioner heads and also resulted in a reduction in changeover time leading to improved efficiencies. The Bakery operators and Engineers are delighted with the new system and the ease at which they can now change the heads.

Mary Collins
Health and Safety Manager,
Green Isle Foods (Longford) Ltd.

Case Study

Johnston Mooney & O'Brien

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Contact: NMaguire@JMOB.ie

The Company

Johnston Mooney & O'Brien, an Irish owned company, has been synonymous with the best in baking tasty breads and morning goods since 1835. The Johnston Mooney & O'Brien group is made up of a bakery in Finglas Dublin and a Bakery in Clonee Co Meath. The Bakeries supply 24 depots throughout the island of Ireland, these depots supply the individual bread vans which do the local sales and distribution to retail outlets. The main products produced are all types of Bread and Hamburger Buns/Rolls.

The Process

Within the Bakery, there are several processes undertaken from Mixing (ingredients brought together into a dough), Proving (dough is allowed to proof over time), Baking (the dough is baking in a hot oven), Cooling (the hot product is allowed to cool to ambient temperature), Slicing (the product is then sliced to allow for its convenience use), and finally, Packing (the product is packing in many user friendly formats for customers). This Case Study relates to moving the large buggies which contain baking trays from a holding area to the bakery production plant for the trays to be placed and removed onto the production line.

Stage 1: Problem Identification

Risk Reduction Reason

Large Buggies which contain Baking trays are manually moved by two operatives from a holding area to the Bakery production plant where the trays are then placed or removed. The Risk Reduction was to eliminate the need to lift, push and pull heavy Buggies containing Baking trays.

In Detail

The issues that needed to be address included the force required to push and pull heavy Buggies.

Evidence of Risk Factors

The Risk Factors included:

- The physical effort of pushing heavy buggies is too strenuous
- Large lifting force required to move buggies into position
- Awkward postures required during the positioning of the buggy
- The load weight (i.e. buggy with baking trays) is too heavy
- Lack of access in the work environment to move the buggy safely

Stage 2: Problem Solving Process

What Was Done?

The current situation was assessed, the engineering and production team came together, to brainstorm, a tug idea was brought forward, and a number of trials took place, and a satisfactory Tug was approved. A new system of work was developed and a New Standard Operating Procedure introduced and the staff trained.

What were the Objectives?

To reduce or eliminate the need for the Bakery operatives to push and pull heavy Buggies.

Evidence of Risk Factors

The Risk Factors included:

- The physical effort of pushing heavy buggies is too strenuous
- Large lifting force required to move buggies into position
- Awkward postures required during the positioning of the buggy
- The load weight (i.e. buggy with baking trays) is too heavy
- Lack of access in the work environment to move the buggy safely

Before: Two Operatives push heavy buggy containing baking trays

Before: Two Operatives push heavy buggy containing baking trays

Case Study (Cont'd)

Johnston Mooney & O'Brien

Risk Assessment Tools

Be-smart.ie Risk assessment tool – the HSA Five step process:

- Understand the task
- Collect the data, assess the weight of the buggy and baking trays, the distances and heights required to move them.
- Identify the risk to the Bakery operatives in the push and pull of Buggies through observation.
- Agree a plan of action, implement and train the operatives.
- Review process and make changes when or if required.

Problem Solving Activities

Consultation, Brainstorming, data collection and observation with the maintenance team and the Bakery Staff.

Stage 3: Outcome

Agreed Changes Recommended

Introduction of new Tug and the development of an SOP and completion of training for all Bakery operatives.

The Main Interventions

The tug was sourced by the engineers. The equipment suppliers modified the tug to meet the task requirements. A certified Tug was purchased. Heavy buggies were modified to allow the tug to connect to the buggy. The Commissioning process was completed for the introduction of the New Tug and then then all staff were trained to the New Standard Operating Procedure for the Tug.

Cost of Intervention

Hire/purchase of Tugs €250/month

Modifying Buggies €200

Miscellaneous €165 steel

Stage 4: Results

Results

The result of the intervention was the elimination of the two-person manual handling (ie. Pushing of heavy buggies). The introduction of the tug has resulted in the buggy transfer operation being a one person task.

Recap on Results

Health benefits (e.g. risk factors like force, repetition, posture eliminated or reduced)

The following risk factors have been eliminated:

- The physical effort of pushing heavy buggies is too strenuous
- Large lifting force required to move buggies into position
- Awkward postures required during the positioning of the buggy
- The load weight (i.e. buggy with baking trays) is too heavy
- Lack of access in the work environment to move the buggy safely

After: The two images show a single operative moving the trays using a tug on the buggy

Case Study (Cont'd)

Johnston Mooney & O'Brien

Was there evidence of innovation or creative thinking in this project?

The maintenance team and the engineers and the operatives in the Bakery were involved in a creative problem solving process which resulted in an innovative engineering solution.

Was there evidence of team work?

Engineering and production teams came together to assess, discuss the ideas, and agree on the implementation of the engineering solution.

Was there evidence of consultation and communication with those that work on this production process?

The ideas generated were discussed and modified through consultation between Engineering and Production.

Was there evidence of any productivity or efficiency improvements?

The process of transferring the buggies is now a one-person task.

Was there evidence of reduced lost days due to accidents or ill health?

There was no recorded accidents to date.

Was there evidence of management commitment and investment in the project?

The plan was agreed by General Manger and all resources committed to the project.

Was there a return on investment in the project?

Not quantified, but acknowledged the increase in efficiency on changeovers and reduction of personnel resources to the task.

Was there any evidence of increased knowledge and awareness of ergonomics?

The problem solving process to address the manual handling issues with the buggy transfer operation has resulted in increased awareness of the importance of ergonomics in task design.

Did the introduction of changes have any positive impact on housekeeping?

The area has good housekeeping and it is maintained this way subsequent to the introduction of changes with the new process.

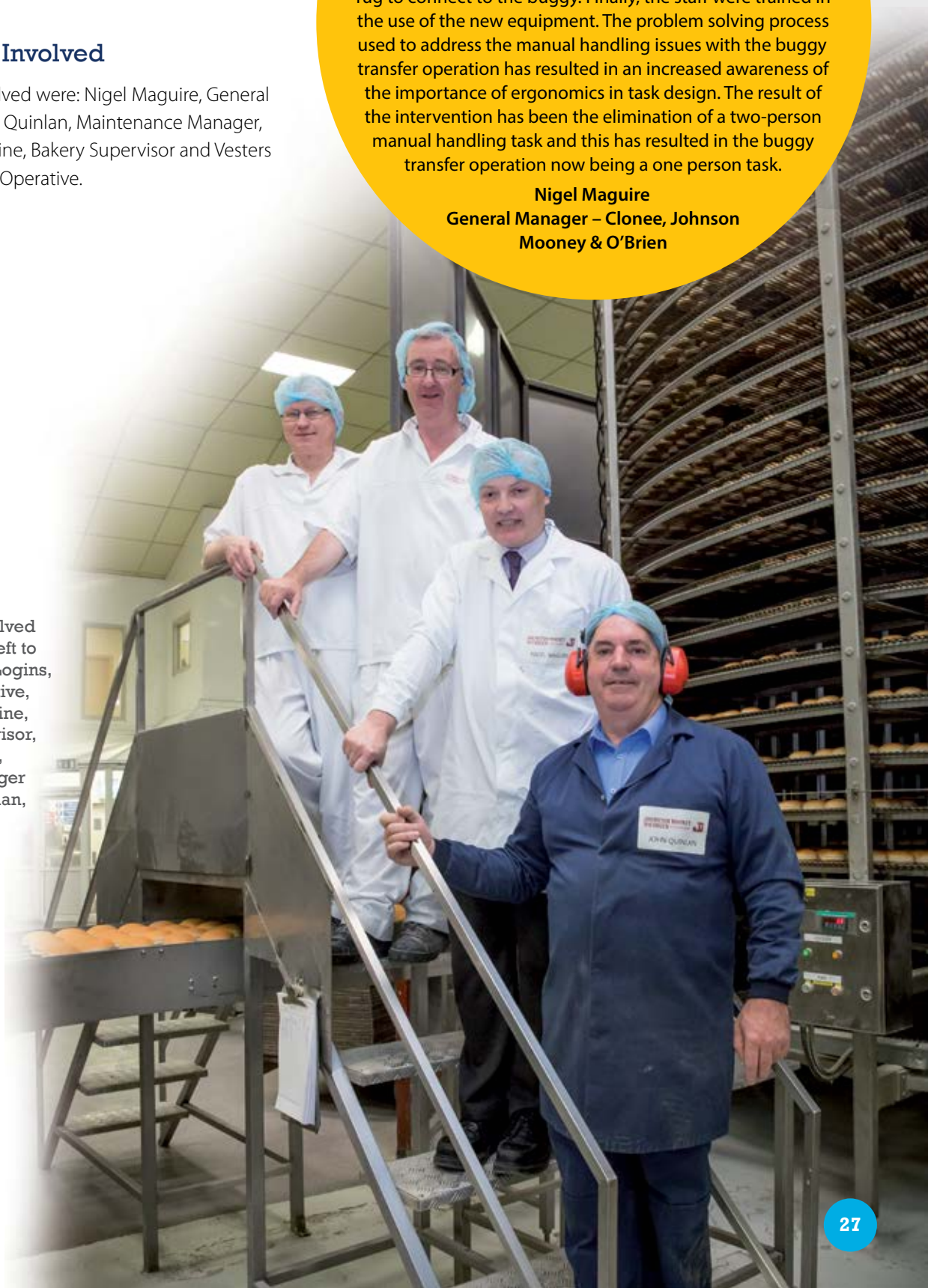
Testimonial

The purpose of the intervention was to eliminate the need to lift, push and pull heavy buggies containing Baking trays. A Tug was sourced and modified by our Engineers to meet the task requirements and also our existing buggies were modified to allow the Tug to connect to the buggy. Finally, the staff were trained in the use of the new equipment. The problem solving process used to address the manual handling issues with the buggy transfer operation has resulted in an increased awareness of the importance of ergonomics in task design. The result of the intervention has been the elimination of a two-person manual handling task and this has resulted in the buggy transfer operation now being a one person task.

Nigel Maguire
General Manager – Clonee, Johnson Mooney & O'Brien

The Team Involved

The Team involved were: Nigel Maguire, General Manager, John Quinlan, Maintenance Manager, Pascal Mountaine, Bakery Supervisor and Vesters Logins, Bakery Operative.



The Team Involved starting from left to right: Vesters Logins, Bakery Operative, Pascal Mountaine, Bakery Supervisor, Nigel Maguire, General Manager and John Quinlan, Maintenance Manager.

Case Study

MFP Plastics Limited

Company: MFP Plastics Ltd.
Address: Laraghcon, Lucan, Co. Dublin
Phone: (01) 630 2600
Email: info@mfp.ie

The Company

MFP Plastics Limited manufactures a comprehensive range of PVCu drainage, roofline and infrastructural duct products primarily for the Irish and UK markets. MFP is an ISO9001 registered company and is part of Grafton Group Plc. MFP Plastics Limited was established in 1967 and is based at Lucan, County Dublin. The company operates from a large manufacturing and warehousing facility utilising the most up-to-date technology and equipment.

MFP has always focussed on innovation and quality, which is supported by a highly skilled, dedicated and effective workforce and management team.

The Process

MFP Plastics manufacture PVCu drainage, roofline and duct system products. The primary processes involved in the manufacture of these products are extrusion and injection moulding. The company manufactures PVCu pipe up to a maximum diameter of 315mm. It also manufactures a comprehensive range of roofline products including rainwater and fascia and soffit systems. These systems are market leading branded products. Continuous product innovation and development, coupled with the highest standards of quality and services, are at the heart of the company. This policy is driven by a strong desire to simplify use, improve performance, reduce costs and adapt to the changing requirements of the markets serviced.

Stage 1: Problem Identification

Risk Reduction Reason

MFP commenced a Process Improvement Project (PIP) with the primary aim of updating its Health & Safety Management System. Part of this process was a review of all risks and the adequacy of the control measures. A number of additives are used in the preparation of the raw materials, which are contained in plastic and paper bags of various weights. As part of the production process, each bag had to be lifted manually from a storage location in the pre-mix area, placed onto a trolley, and then lifted from the trolley into a weigh station. As part of the PIP, it was decided to investigate whether or not there was an opportunity to change this system of work to reduce or avoid the risk of injury.

In Detail

Evidence of Risk Factors

Below is a summary of the main risk factors for the task of lifting bags from the storage location and transferring them to the weigh station:

- Lifting above shoulder height and below knee height
- Awkward posture when lifting away from the body
- Load weight too heavy (25 kg)
- Physical activity too strenuous

Stage 2: Problem Solving Process

What Was Done?

A comprehensive risk assessment programme was carried out using the TILE formula where the Task, Individual, Load and Environment were considered. The Production Manager, Production and Purchasing Coordinator, Senior Day Foremen, OHS Advisor, Plant Engineer and Operative were involved in this risk assessment.

What were the Objectives?

To eliminate or reduce the risk factors resulting from the manual handling of the bags at the pre-mixing area and weigh station of the production process.

Evidence of Risk Factors

The risk factors were:

- Lifting above shoulder height and below knee height
- Awkward posture when lifting away from the body
- Load weight too heavy (25 kg)
- Physical activity too strenuous

Before: Operative lifts bag manually from a storage location in the pre-mix areas and places it onto a trolley

Before: Operative lifts bag and places it onto a trolley and then lifts bag from the trolley into a weigh station

Case Study (Cont'd)

MFP Plastics Limited

Risk Assessment Tools

The Risk Assessment Tool used was the TILE Formula and an in-house consultation process.

Problem Solving Activities

Consultation with all stakeholders took place, while workstations and operations were reviewed. A review of the risk assessment was also conducted to develop an engineering solution.

Stage 3: Outcome

Agreed Changes Recommended

Engineering changes were deemed to be the most suitable solution. This involved the purchase and installation of new equipment.

The Main Interventions

A range of interventions took place. MFP commissioned a specialist handling equipment supplier to supply a power vacuum lifter and a scissor lift table specific to the requirements of the company. Training in the operation of both units was also provided. An updated risk assessment was carried out after the installation process.

Cost of Intervention

MFP's primary aim is to continually improve on our risk management process. The value of the change achieved is expressed as the outcome less the cost factors. The financial factors were considered minimal in terms of the outcome achieved. The costs were €7,750 for the Vacuum Power Lift and the Scissors Table combined.

Stage 4: Results

Results

The overall pre-mix operations have improved in efficiency and output. The feedback from the Operative has been excellent. The risk of injury has been reduced significantly as a result of the engineering interventions that have been introduced.

Recap on Results

Health benefits (e.g. risk factors like force, repetition, posture eliminated or reduced)

A number of benefits were achieved due to the reduction in repetition and posture for the Operative. The Operative noticed a reduction in fatigue levels.

Evidence of innovation or creative thinking?

A combination of the various stakeholders brought experience and technical competencies to the project. This allowed for full inclusion of all vested interests to achieve a common goal.

After: Operative slides bag onto a scissors lift table

After: Operative uses a power vacuum lifter to move bag

Case Study (Cont'd)

MFP Plastics Limited

Evidence of Teamwork?

There was a high level of cooperation between all parties and various discussions took place to ensure that the most practical solution could be found and implemented.

Evidence of consultation and communication with those who worked on this production process?

Communication was maintained throughout the project until closure.

Evidence of any productivity or efficiency improvements?

This was noted by the Production Manager upon monitoring/observation. The Operative has expressed his appreciation for the investment and the positive impact that it has had on his normal working day.

Evidence of reduced lost days due to accidents or ill health?

The absence level prior to the installation was negligible and remains so; therefore, no specific figures can be provided.

Evidence of management commitment and investment?

The investment made was not only capital in nature, but also required the sourcing of external advisors and the investment of time to identify the most effective solution for the project.

Was there a return on the investment?

There was no demonstrable financial gain, but productivity and worker satisfaction improved significantly.

Evidence of increased knowledge and awareness of ergonomics?

A fuller understanding of the mechanical and biomechanical operations was achieved due to the time commitment given to the investigation phase.

Did the introduction of changes have any positive impact on housekeeping?

A high standard of housekeeping was in place, which has now further improved.

Testimonial

As part of our production process, bags containing raw materials had to be placed onto a trolley from a pre-mix storage location; then the bags were lifted from the trolley to a weigh station. We wanted to investigate whether or not there was an opportunity to change this system of work to reduce or avoid the risk of injury by eliminating or reducing the risk factors resulting from the manual handling of the bags. There was a high level of cooperation between all parties and various discussions took place to ensure that the most practical solution could be found and implemented. An intervention took place by commissioning a specialist handling equipment supplier to supply a power vacuum lifter and a scissor lift table specific to the requirements of MFP Plastics Ltd. Productivity and efficiency improvements were noted and the Pre-Mix Operative has expressed his appreciation for the investment and the positive impact that it has had on his normal working day.

Martin Carr - Production Manager,
MFP Plastics Ltd.

The Team Involved

(left to right)

Martin Carr,
Production Manager,

Frank Conlon,
Pre-Mix operative,

Pat Scanlon,
Production and
Purchasing
Co-ordinator,

Niall Edwards,
Health and
Safety Advisor.

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