

Business Case: Ergonomic Workplace Design

Support to Safety Retrofits and Environmental Upgrades in the Bangladeshi Ready-Made Garment (RMG) Sector

Why Ergonomic Workstation Design is Worth the Investment

According to the International Labour Organization (ILO) over 313 million work-related non-fatal accidents and ill-health incidents are happening annually, each requiring at least four days of absence from work, resulting in ill-health of 860,000 workers every day.¹

Major reasons for worker illness are found to be disorders of the spinal column and of the shoulder and arm or musculoskeletal disorders (MSD), often caused by poorly designed workstations which give little or no consideration towards matching the abili-

Advantages of ergonomic workstation design at a glance:

- Reduced work-related illnesses
- Reduced loss of working hours
- Increased machine operating time and increased overall worker productivity
- Reduced error rates
- Better worker-management relationship
- Enhanced workplace conditions attract skilled workers and international clients and reduces turnover rate

ties of the operator with the task requirements².

With over 34% of all working days lost because of MSD, the textile and sewing industry are particularly vulnerable in regard to lost worker productivity and unnecessary injury at the workplace.

Providing a healthy and ergonomic work environment is therefore not only desirable from the perspective of your workers, it also contributes considerably to labour productivity and promotes the economic growth of the company by reducing the level of work related illnesses as well as the corresponding loss in working hours.

Ensuring ergonomic working conditions within a factory is easy. Either existing workstations are modified or new workstations are designed with the aim to achieve an appropriate balance be-

tween workers capabilities and work requirements, optimizing their productivity and providing physical and mental well-being, job satisfaction as well as safety.

Possible measures of workplace conversion could for instance include:

- Ergonomic spatial arrangement of the workspace which encourages an upright posture and thus reduces the strain on the spinal column
- Installation of adjustable worktables, making it comfortable to change between sitting and standing activities
- Redesign of the foot space enabling the feet and legs to move unhindered
- Installation of individually adjustable support pieces for hands and arms, resulting in a reduction of static strain on the shoulder and neck muscles

Depending on the measures taken, the cost of ergonomic reorganization of the workstations can strongly differ. However, experiences from the textile industry in Sri Lanka suggest that the average costs for upgrading sewing workstations are approximately BDT 10,400 per workstation.

The economic benefit that arises from such an investment are for instance shown by German textile and garment manufacturers which retrofitted ergonomically redesigning sewing workstation and thereby were able to reduce the overall days of sick-leave by approximately 16% - 35% while simultaneously increasing the workers productivity by around 15%. Based on this reduction in loss of working hours and the increased productivity the return on investment can range from 3:1 to 15:1^{3,4}, resulting in an average payback period of approximately 0.7 years⁵.

Detailed information about the cost and benefits of an ergonomic workstation design can be found on the next page, followed by a case study example on page 3. Technical details on the installation and implementation process as well as legal requirements and possible means of financing can be found on pages 4 to 5.

¹ EU-OSHA (2017). Estimating the costs of work-related accidents and ill-health: An analysis of European data sources

² Satish Mujumdar, Samata et al. (2013). Industrial WorkStation design: An Ergonomic Approach to Number Punching Machine

³ EU-OSHA (2008). Systematic ergonomic workplace design in sewing work

⁴ Puleio, Jonathan & Zhao, Jenny (n.d.). Return on Investment for Ergonomics Interventions

⁵ Goggins et al. (2008). Estimating the effectiveness of ergonomics interventions through case studies: Implications for predictive cost-benefit analysis

Improve your Workspace, Increase your Productivity

The systematic design of ergonomic workstations is connected to a range of direct and indirect benefits for the company. They are further explained in the following tables:

Direct Benefits

Increased machine operating time and increased overall worker productivity	A good ergonomic workstation design has a direct impact on the machine operating time, increasing it up to 50% and leading to an increase in overall worker productivity of around 15%. This increase in productivity can be translated to around BDD 1.9-2.5 lakh increase in productivity per worker shift. ^{6,8}
Enhanced workplace conditions attract skilled workers and international clients	Providing ergonomic workstations to the workers significantly improve the general working conditions which in turn adds to factory's reputation as a supplier as well as its attractiveness as an employer. Experience from India shows that ergonomic workstations make it easier to find skilled workers as well we find new international clients.
Increased worker satisfactions and reduced worker turnover rates	Improved working conditions for your workers will help you to retain skilled personnel within the company thereby reducing the turnover rate of the workforce. A comparison of measures from 114 ergonomics program case studies shows that on average the turnover rate is reduced by 40% in non-office jobs. ⁷

Indirect Benefits

Reduced Work-related illnesses and sick-leave days	Several international occupational health studies show that work-related musculoskeletal disorders (MSD) account for approximately 35% of all working days lost due to work-related ill health. By providing ergonomic workstations the risk of MSDs can be reduced, decreasing the average days of sick leave per worker by between 10% and 35%. ^{8,9}
Reduced risks of work-related injuries to staff and reduced risk of compensations claims	Since improving the ergonomics of workstations positively affects the health of the workers and prevents work related injuries or accidents, the chance of compensatory payments and claims reduces as well. The results from case studies of five major US companies show that the implementation of ergonomic programs within these companies led to a significant reduction of worker's compensation claims, ranging from 35% to 91%. Furthermore, the average cost per injury claim was reduced by up to BDT 13,9 lakh. ¹⁰

⁶ EU-OSHA (2008). Systematic ergonomic workplace design in sewing work

⁷Goggins et al. (2008). Estimating the effectiveness of ergonomics interventions through case studies: Implications for predictive cost-benefit analysis

⁸Health and Safety Executive (n.d.). Work-related Musculoskeletal Disorders(WRMSDs): Statistics in Great Britain 2017

⁹Puleio, Jonathan & Zhao, Jenny (n.d.). Return on Investment for Ergonomics Interventions

¹⁰ebd.

Calculating the Cost for Ergonomic Workstation Design

The cost of designing and implementing ergonomic working stations are highly depended on factors like the number of workers, the areas in need of improvement, user requirements or the kind of work that is done. The average costs for the systematic design and implementation of ergonomic workstations depends on the type and number of workstations to be upgraded. For example, in Germany the cost would be roughly BDT 150,000 per workstation, while in Sri Lanka as mentioned cost may less than 10% of this amount. A selection of possible ergonomic investments is shown in the following table.

Possible investments for ergonomic workstation design:

Type of Investment	Average Cost (BDT)
Adjustable Task Chair	5,000
Ergonomics Training	16,900
Anti-fatigue Mat (18m)	1.5 lakh
Installation of task illumination (minimum lighting level of 400 lx is recommended)	2,400
Machines and equipment with adjustable work surface height	Depending on type of equipment
Other low-cost solutions for improved workstation ergonomics	
Redesign of the foot space	Minor
Individually adjustable support pieces for hands and arms	Minor
Installations of platforms or similar flat structures under the working stations	Minor
Ear protection for workers exposed to high noise levels	Minor
Average Costs per Workstation	11000 – 15000 BDT

Apart from physical workplace alterations, potential solutions for prevention of work-related musculoskeletal disorders caused by repetitive motions can include:

- Job rotation to break up a worker's exposure to a specific repetitive motion
- Job diversity which reduces monotony, boredom, and the potential for injury. Jobs with greater diversity also provide workers with a sense of accomplishment.
- Frequent short breaks to provide workers with the opportunity to recover from their activities for instance through stretching and relaxing their muscles

Case Study Spotlight: Hirdaramani Industries Pvt Ltd, Kahathuduwa, Sri Lanka

Description of the Factory

Hirdaramani Group is a pioneer in the Sri Lankan apparel industry and operates factories in Bangladesh and Sri Lanka. The factory located in Kahathuduwa, Sri Lanka is one of their major production facilities and started its operation in 2000. As of 2018, 1,500 people are working in the factory and its annual production capacity amounts to 3 million pieces. In 2017 the total amount of greenhouse gases produced by the factory amounted to 209.1tCO₂eq. To reduce their Carbon Footprint even further Kahathuduwa aims to cover at least 33% of the factory's total energy demand by installing solar PV systems with a combined capacity of 1.4 MW on the roof of their production building. Moreover, the facility scored 62 (verified) for Higg Index (FEM2.0) and is certified for ISO 14001:2015 environment management system. The major production steps performed in the factory include cutting, sewing, ironing and finishing. The different production units are located in the same building and occupy a total area of 16,800 m². Besides the production units the factory premises also include a herbal garden, a vegetable garden and a butterfly garden.

Implemented Measures

Although the Kahathuduwa factory is mainly seen as a pioneer with regards to their environmental performance they also serve as a role model when it comes to providing workstations that minimise the risk of injury and maximise productivity. After a detailed scientific and evidence-based assessment of the workplace ergonomics in different production steps the factory management decided to take the following actions:

Posture

- Provision of chairs with adjustable height and comfortable back rest
- Sewing machines and ironing tables with adjustable height type to improve working posture and visibility of the working surface
- Provision of comfort arm rests
- Modified foot spaces and footrests to increase movement space and work comfort.

Environmental Factors

- The thermal comfort for the floor is maintained by running two chillers to maintain internal temperature below 26°C.
- General lighting is provided by a skylight system and LED tube lighting system to maintain an average lux level of 600 lux across the production floor.
- To ensure a lux level of 900 lux at the needle point adjustable LED task lights were installed.
- Rubber carpet/mats are placed at each workstation to prevent operators from static charge/ shock.

Other

- In addition, workstation job rotation has been introduced.

Challenges during Implementation

Hirdaramani Group was among the first factories in Sri Lanka to include ergonomic aspects in the design of their workstations. Thus, finding local experts to conduct the assessments as well as ensuring that workers understand how to adjust their workstation following ergonomic principles presented a challenge initially. Furthermore, upgradation of the workstations without disrupting the production process proved to be challenging. In this regard, meeting production targets during the transformation period required special efforts.

Besides providing workstations that ergonomically friendly introducing job rotation is an effective way to reduce physiological stress, strain and fatigue to muscle groups used for one job. However, the possibility of job rotation is often limited by the availability of multi skilled employees.

Key Performance Measures

Providing ergonomic workstations not only reduces the risk of injury but has proven to increase production efficiency and productivity. Statistics prove that production efficiency improved by 5% (9350 pieces/day to 9800 pieces /day) after the management of the Kahathuduwa factory invested in improving the ergonomics of their workstations.

Besides these output-related performance indicators, Hirdaramani Group also reported that the number of health-related worker complaints registered decreased and that overall worker satisfaction improved. Consequently, this allowed the Kahathuduwa factory to retain the highest skilled workers leading to reduced cost of hiring and training new workers.



Higg Index, EMS ISO 14001

Features of Ergonomic Workstations

Properly set-up workstations help workers to maintain a so-called neutral body posture. This is a comfortable working posture, in which the body's joints are naturally aligned. This reduces stress and strain on the muscles, tendons, and skeletal system, and minimizes the risk of developing MSDs.

Further features of overall good workstation ergonomics include improved levels of illuminations as well as reduced exposure to noise, dust and humidity levels within the immediate and general working environment.

By controlling these environmental conditions an adequate workstation helps to prevent fatigue, eye strain, headaches and stress.

Legal and other References in Bangladesh

Although there are no binding legal references regarding design of ergonomic workstations in Bangladesh yet, many international buyers – especially in the textile and sewing industry - have included ergonomic requirements in their supplier code of conducts or health and safety guidelines¹¹. These guidelines which do not necessarily match local jurisdiction have to be implemented in order to establish and sustain business with international buyers.

When designing or remodelling workstations in the textile and sewing sector following factors have to be taken into consideration:

- The task (e.g. type of seam)
- Type of workpiece (e.g. size and weight)
- Existing working environment (e.g. fixed sewing level)
- The workers body measurements

For further detailed information on international good practice and guidelines regarding the design of ergonomic workstations in the textile and sewing sector it is recommended to refer to the practice oriented guidelines for ergonomic sewing workstations prepared by the German Berufsgenossenschaft für Energy, Textil, Elektro und Medienerzeugnisse (BG ETEM)¹².

The GIZ program on promotion of Social and Environmental Standards (PSES) as well as the ILO Better Work initiative are two of the initiative supporting the industry on addressing ergonomic issues in the textile and ready-made garment sector.

Key Steps Required for Implementing

As per experience, the implementation of measures to improve the overall ergonomics of the workplace can range from few weeks to several months (including planning and design).

An easy-to-use checklist for the design and implementation of ergonomic workstations is readily available from the ILO – See Ergonomic Checkpoints Guideline¹³. Following the steps as described in this guideline will provide a better understanding of points to be considered while designing and/or upgrading workstations in a factory along common good ergonomic practices:

- Agree on main areas requiring immediate improvements in a group work process.
- Select a limited number of checkpoint titles from among those listed in the ergonomic checklist provided within guideline
- The selected items can be put together to form a draft checklist. This draft checklist can follow a format given in the guideline by answering the question: “Do you propose action?” by NO or YES and pointing out whether the action is priority or not. The draft may be tested through its pilot use including a walk-through around a particular workplace.
- Finalize the checklist by obtaining feedback from the pilot use
- When specific aspects of ergonomic conditions require particular attention, a more specific checklist may be designed by concentrating on these particular aspects. For example, a checklist relating mainly to physical tasks may be formulated when local people agree to focus on musculoskeletal complaints
- Identifying locally practicable and feasible solutions and improvements using the checklist. This process can be supported by workplace visits and the discussion in small groups
- Prioritize immediate actions to be taken. Both long and short- and long-term priorities might be chosen.
- Organizing trainings and workshops for immediate workplace changes
- Design ready-to-use information sheets explaining practical ergonomic improvements

Availability of materials in Bangladesh

Most of the required materials and components for ergonomic workstation equipment can be sourced via local traders or manufacturers. For recommendations regarding possible suppliers, you may contact Hirdaramani Industries Private Limited.

¹¹E.g. Adidas Group (2010). Health and Safety Guidelines, Section 21 - Ergonomics

¹²BG ETEM (2013). Ergonomie an Nährbeitsplätzen. Available in German online at: http://ef.bgetem.de/htdocs/r30/vc_shop/bilder/firma53/bgi_804-2_a08-2013.pdf

¹³ILO (2010). Ergonomic Checkpoints: Second Edition

Nature of Services Required to Support the Implementation

- Ergonomic assessment of workstations and workspace
- Selection of appropriate workspace conversion measures
- Installation or upgradation of services for improving and redesigning workstations
- Worker training to improve awareness for workplace ergonomics

Sources of technical support/expertise

For further technical details and guidance regarding ergonomic workstation design, the following resources can be used:

- ILO (2010). Ergonomic checkpoints: Practical and easy-to-implement solutions for improving safety, health and working conditions. Second edition. Geneva, 2010
- BG ETEM (2013). Ergonomie an N aharbeitspl tzen. Available in German

Please be aware that the finding readily available ergonomic specialists may still pose a challenge in Bangladesh.



Workplace illumination improved to meet visual comfort

Possible Sources for Financing

SREUP credit line could be a good source of financing for such an investment.

Main Feature of SREUP Credit Line	
Loan Type	Normally Term Loan
Discount	Provision and possibility of 20% discount from loaned amount
Loan Tenure	3-5 years in general and in special case up to 7 years
Loan Limit	Normally up to 1 Million Euro and can be increased up to 3 Million Euro in special cases
Interest Rate	7% p.a. (maximum)
Grace period. Debt: Equity Ratio. Repayment	All issues are subject to agreement between borrower and lender



Workstation support for eyes contact to source



Carpet for workers where one worker is working in standing position