

designed to suit the needs of the individual worker depending on the height, size, etc. and the type of machine being used. Similar study conducted by Haider et.al, (2007) found that the uncomfortable workstations caused pain, numbness or tingling in the shoulders, neck, back and hands, eventually affected the productivity of sewing machine operators. Berry, McNealy, Beauregard, Dickens and Geddie (2009) viewed that a workstation should be designed to accommodate the person who actually works on a given job. Workstations should not force workers into awkward body positions and workstation should be adjustable. The workspace should be large enough to allow for the full range of required movements. Muhundhan, (2013) indicated that, a well organized work station minimizes material handling, improves efficiency and reduces workers fatigue. By making

workstations comfortable, productivity and efficiency of the worker can be improved in terms of quality and quantity. Consistent manufacturing in high quality goods leads to repeat orders thus enhances growth of the industry. Anand and Kamra (2010) conducted a comparative study on existing and designed workstations. They found that only 25% workstations and work methods require investigation, 45% require investigation and change and 30% immediate change. Workstation used in garment industry needs to be more flexibility in height and angle adjustment. Designed and flexible workstations provide better and safer working environment and reduce the absenteeism and increase the performance.

Table 2: Material Handling and Storage in Low, Medium and High Productivity Units, (n = 120)

S. No.	Material handling and Storage	Low Productivity Units		Medium Productivity Units		High Productivity Units		χ^2	Sig.
		(n = 40)		(n = 40)		(n = 40)			
		Yes		Yes		Yes			
		f	%	f	%	f	%		
1	Clear working tables	21	53	30	75	38	95	18.76	0.01
2	Easy movement of material	19	48	27	68	32	80	9.45	.009
3	Use of material handling equipments	24	60	29	73	38	95	13.73	0.01
4	Use of ramps	26	65	25	63	29	73	.975	.614
5	Storage of trims in boxes	25	63	26	65	32	80	7.46	.024
6	Obstacles in material flow	37	93	31	78	25	63	10.32	.006
7	Removal of unnecessary items from aisles	27	68	29	73	28	70	.752	.686

Results shows in table 2 that χ^2 value of clear working tables is $\chi^2 = 18.76$, $p < 0.05$, which is significant. χ^2 value of easy movement of material is $\chi^2 = 9.45$, $p < 0.05$, which is significant. χ^2 value of use of material handling equipment is $\chi^2 = 13.73$, $p < 0.05$, which is significant, similarly χ^2 value of storage of trims in boxes $\chi^2 = 7.46$, $p < 0.05$, which is significant, χ^2 value of obstacles in material flow $\chi^2 = 10.32$, $p < 0.05$, which is significant. This significant difference indicates that these all factors have a significant difference in low, medium and high productivity units. There is no significant difference found other factors such as use of ramps and removal of unnecessary items from aisles.

Difference of material handling and storage between low, medium high productivity units

It was found in **low productivity units** working tables were not cleared from time to time so garments were piled up on the tables and it created difficulty in terms of visibility of garments and resulted in mixing of garments lots. Some of the units used material handling equipments such as racks and containers to keep the material in organized way. It was seen that in fabric store room, fabric rolls were not stored properly and were laid on the floor and got soiled. Lots of pieces were laid down on the floor in the stitching and finishing section. In stitching section, boxes were not kept on the workstations for keeping the stitched garments. The garments were piled up at the workstation and it made the handling difficult and increased the material handling. It also affected the efficiency of operators. In finishing section, boxes were not used to keep the finished and unfinished garment. Garments were piled up on the finishing tables which were the cause of mixing of finished and unfinished garment. It was also observed that there was no adequate

storage at the workstations. It was seen in stitching section, that machine placement was improper so the passage of sewing operators obstructed the workers and material. Some of the low productivity units used the ramps for easy movements of material handling equipments from one floor to another floor. It was found that material flow was not proper and clean; obstacles such as packing cartons, garments, fabric rolls and baskets were found in cutting, stitching and finishing section. Excessive long movement was observed from one section to another section as relative sections such as cutting and stitching were situated on different floors influencing the smooth and easy movement of material. Some of the units provided the labeled boxes of hooks, threads and other materials to the workers for easy and organized storage.

It was found that in **medium productivity units**, majority of units used material handling equipment and multi storage racks. Some of the units used ramps for easy movement of material handling from one floor to another floor. Obstacles were found in every unit which was the major problem that affected the movement of material and workers as it reduced the efficiency of workers. Tables were cleared regularly for efficient work and visibility of material. Majority of units removed the unnecessary items from aisles. In **high productivity units**, finished and unfinished garment were kept in separate boxes. Rejected garments and defective garments were also kept in separate boxes; it reduced the movements and improved the work efficiency of the workers. The layout of departments was adequate with different sections located near to each other hence excessively long movements were not found. Obstacles such as packing cartons were also found which were unsystematically laid on the floor of the finishing section and cut bundles of pieces on the floor of cutting section. These obstacles affected the movements and decreased the

smooth work flow of the layout and reduced the efficiency of workers. Majority of workers used ramps for easy material handling.

Similarly Hiba (1998) viewed that the storage and handling of raw materials, components and products is an integral part of production processes. It can ensure the smooth work flow and helps to avoid delays and bottlenecks. Extra stock is a waste which again requires storage, record keeping and handling. It ends up as unused capital and some costly materials can become spoiled or obsolete. Leaving dead stock and work in process around or in the production area, reduces the space available for production operations and impedes the movement of workers. The more cluttered the shop-floor, the more likely materials and work-in-progress will be mixed up or lost. Workers spend valuable productive time looking for things.

Mishra (2010) designed and planned material handling equipments and workstations. Identified the material handling system at existing factory and designed the new material handling system and the layout for the new factory. Layout was designed for manufacturing 11,500 shirts/day. Result shows that systematic integration of efficient material flow and effective facility layouts for industrial establishments are essential for organized applicability of procedures on the production floor. It is a pre requisite to efficient production planning and higher productivity. Similarly Singh and Fatehpuria (2011) studied industry workflow, material flow workstations and analyzed the area and the building for the new industry and determined the capacity. Thus, an efficient workplace layout was made and it was suggested that material handling equipments should be used for minimizing the material handling.

Table 3: Working Environment and Cleanliness in Low, Medium and High Productivity Units, (n = 120)

S. No.	Working environment and cleanliness	Low Productivity Units		Medium Productivity Units		High Productivity Units		χ^2	Sig.
		(n=40)		(n=40)		(n=40)			
		Yes		Yes		Yes			
		f	%	f	%	f	%		
1	Provision for scrape removal	8	20	6	15	27	68	27.30	0.01
2	Regular cleaning from floor and tables	9	23	17	43	21	53	10.94	.004
3	Well maintained equipment and machineries	22	55	22	55	32	80	7.17	.028
4	Proper ventilation	37	93	37	93	39	98	8.90	.012
5	Proper lighting	37	93	36	90	37	93	1.21	.545

Table 3 revealed that χ^2 value of provision for scrape removal is $\chi^2 = 27.30$, $p < 0.05$, which is significant. χ^2 value of regular cleaning from floor and tables is $\chi^2 = 10.94$, $p < 0.05$, which is significant. χ^2 value of well maintained equipment and machineries is $\chi^2 = 13.73$, $p < 0.05$, which is significant, similarly χ^2 value of storage of trims in boxes $\chi^2 = 7.17$, $p < 0.05$, which is significant. χ^2 value of proper ventilation is $\chi^2 = 8.90$, $p < 0.05$, which is significant. This significant indicates that these all factors have a significant difference in low, medium and high productivity units. There is no significant difference found in proper lighting.

Difference of working environment and cleanliness between low, medium and high productivity units in term

In low productivity units, fabric stores were not properly cleaned. Dust and scraps were lying all over the floor; sweepers were not regular in cleaned leading to accumulation of cut fabrics and scraps. In cutting section, unidentified material, fabrics, tools were laid under the tables along with cutting wastage. Garments were laid down on floor in unsystematic manner. Some of the unit workers reported that machineries and equipments were not well maintained, no regular cleaning and maintenance was done of the machineries. Lighting was proper in each section.

In medium and high productivity units, overall cleanliness was also poor. Garments and cut parts of fabric were laid down on the floor and under the cutting tables. No regular cleaning was done to remove the dust from floor, tables and equipments. All this reduced the efficiency and productivity of the workers. Though, machine maintenance was done regularly. In high productivity units there was the provision of scrape removal. The left over cut fabrics in cutting department was stitched to make a patch fabric which was in turn utilized for constructing different type of skirts and tops. Machine maintenance was better two mechanics were always presented in the units for repairing the breakdown and regular maintenance of machinery. Working environment is a major factor. This encourages not only the job to be done but dignifies the human working in the environment and improves working efficiency. Lighting and ventilation was proper in all the sections. The lighting, ventilation and cleanliness levels in the organization affected comfort, working efficiency and improved the productivity. Kelegama and Epaarachchi, (2001) found that one of the most important factors that affected the productivity of labor is poor working conditions. In many of the factories, especially those belonging to the small and medium category, hazardous factory layout with cramped workspace for the workers are not conducive to improve output. Similarly Aloysius (n.d.) found that most of the garment industries haven't maintained proper ventilation and circulation of air.

Table 4: Welfare facilities in Low, Medium and High Productivity Units, (n = 120)

S. No.	Availability of welfare facilities	Low Productivity Units		Medium Productivity Units		High Productivity Units		χ^2	Sig.
		(n =40)		(n =40)		(n = 40)			
		Yes		Yes		Yes			
		f	%	f	%	f	%		
1	Canteen facilities	-	-	10	25	30	75	53.73	0.01
2	Transport facilities	10	25	25	63	28	70	17.28	0.01
3	Security benefit (EPF)	-	-	10	25	19	48	24.64	0.01
4	Medical facilities	15	38	23	58	32	80	14.88	0.01
5	Sanitation facilities	25	63	30	75	37	93	10.15	.006
6	Availability of lockers	-	-	10	25	16	40	19.24	0.01
7	Hygienic place for meals	15	38	23	58	28	70	8.68	.013

Table 4 indicates that χ^2 value of canteen facility is $\chi^2 = 53.73$, $p < 0.05$, which is significant. χ^2 value of transport facility is $\chi^2 = 17.28$, $p < 0.05$, which is significant. χ^2 value of security benefit is $\chi^2 = 24.64$, $p < 0.05$, which is significant, similarly χ^2 value of medical facility $\chi^2 = 14.88$, $p < 0.05$, which is significant. χ^2 value of sanitation facility is $\chi^2 = 10.15$, $p < 0.05$, which is significant. χ^2 value of availability of lockers is $\chi^2 = 19.24$, $p < 0.05$, which is significant. χ^2 value of hygienic place for meal is $\chi^2 = 8.68$, $p < 0.05$, which is significant. This significant indicates that all factors of welfare facilities have a significant difference in low, medium and high productivity units.

Difference of availability of welfare facilities in low, medium and high productivity units

It was found in low productivity units the welfare facilities were very poor. None of the units provided the canteen facility, EPF, education facility, child care facility, locker facility and recreation facility. Very few units were provided with transport facility and medical facility. With regard to medical facility, only first aid treatment was provided. Majority of units provided sanitation facilities like drinking water, clean urinals etc. Some units provided hygienic sitting place for meals.

In medium productivity units, none of the units provided educational, child care and recreational facility. Though in some of the units canteen facility and transport facility was provided. Canteen facility included only tea, coffee but no food was served. Units which provided transport facility deducted the amount from the salary of workers. Some of the units deducted the EPF of their permanent employees. First aid, drinking water, clean urinals and proper sitting area for meal were provided in most of the units. In high productivity units educational, child care and recreational facilities were not provided. Majority of units were provided with canteen, transport, medical, sanitation facilities and hygienic sitting place for having meal. Transport facility was free for permanent employees whereas newly recruited employees paid for transport. For medical facility, first aid and sick room was also available in the units. Clean urinals, safe drinking water, and proper area for meal were provided in the units. Some of the units deducted the PF for their fixed employees and some of the units provided the lockers for their permanent employees to keep their things. Workers were satisfied with regard to the provident fund and the functioning of the provident fund trust committee. None of

the units provided the life and medical insurance benefits. It was found that labor welfare facilities affected the outlook of employees towards work. The employees were satisfied with the labor welfare facilities which get them better working life, family life and overall welfare.

Arai (n.d) found in his study that, Payment of the Employer's Provident Fund (EPF), break time, free tea, recreation, transport, infirmary, regular visit of doctors, etc. were provided by factories. More than 80% of workers found adequate facilities in factories. He found that job satisfaction and the different dimensions of welfare facilities were significantly related. Welfare facilities should be well implemented and so should labor welfare measures so that the level of job satisfaction increases among employees, which in turn might help in increasing productivity of workers. Aloysius (n.d.) reported that, services were provided to the workers yielding productivity in garment sector. None of the workers enjoyed the financial legal services, recreational programmes and educational services. First aid services and other medical services were considerably provided to the workers. A positive indication was observed from the data was that all the workers had the benefits of sanitation facilities in the garment industry. Kumar (2006) deduced that garment industry workers were concerned with long working hours or double consecutive shifts, personally unsafe work environment, poor working conditions, though most of them worked late. There were no safety measures for them and no residential facilities or transportation facilities. Ahmad (n.d.) viewed that many industries provided workers certain tangible benefits over and above the basic pay. Some benefits helped fulfill the social and recreational needs of workers such as a festival bonus, a target bonus or a production bonus. They may provide extra income and a better work environment in future. Such benefits enhance employees loyalty and build a positive attitude towards the company.

4. Conclusion

Working conditions were analyzed to evaluate the workstation designs, material handling and storage, working environment, cleanliness and welfare facilities. After the comparison of low, medium and high productivity units, it was concluded that in high productivity units, working conditions were better as compared to medium and low productivity units.

The management is unaware of many issues related to working conditions. The apparel industry should evaluate the working conditions and welfare facilities and should take

corrective measures accordingly. Good working conditions are essential for productive work. Most workers in industries producing garments repeat the same or similar operations for the whole production lot which, if performed efficiently and quickly, can result in better productivity. Each workstation should be designed to suit the needs of a worker, the machine and the task to be performed.

5. Recommendations

- Workplace should be organized to eliminate the obstacles and there should be smooth material flow. Placement of machines should be in such a way that it does not interfere with movement of workers.
- Cleaning of inspection tables and machines should be done daily and especially before starting the work.
- Workstations should be situated close to each other with basket kept in between for keeping the garment pieces. Finished pieces should be kept in separate baskets for easy handling.
- Tables and racks should be used to store the fabric rolls and should be covered to avoid it getting dirty.
- Cut pieces should be kept in an order and in specified area so that cleanliness is maintained in the units. Regular cleaning should be done from time to time.
- Trolleys should be used for transferring the pieces of garments from cutting to stitching and finishing section. Boxes should be used for reducing the unnecessary handling.
- Stools and tables should be of proper height so that there is not interference of height with the work.
- Various facilities like canteen, medical, crèche lockers should be provided to the workers. Rest room and sick room should be made available in the industries in case of emergency.
- Celebrations, recreational programme and motivational lectures should be there for the workers. It will help in developing their potential to the fullest.

References

- [1] Ahamed, F. (n.d.). Improving social compliance in Bangladesh's readymade garment industry. Retrieved from <http://www.nla.gov.au/openpublish/index.php/lmd/article/viewFile/2269/3148>
- [2] Aloysius, A. (n.d.). A study on garment mobility in Tirppur. A Project conducted by labour resource center save. Retrieved from <http://www.savengo.org/pdf/PDFonline1.pdf>.
- [3] Anand, A. & Kamra, K. (2010). Ergonomically suited workstation design for reduction of postural Hazards. (Graduation Project, Technova, Book of abstracts, National Institute of Fashion Technology, Gandhinagar, Gujarat). Retrieved from [http://www.nift.ac.in/gandhinagar/downloads/Technova % 202010.pdf](http://www.nift.ac.in/gandhinagar/downloads/Technova%202010.pdf)
- [4] Arai, E. (n.d.). Readymade garment workers in Sri Lanka : Strategy to survive in competition. Retrieved from [http://www.ide.go.jp/English/Publish/Download /Jrp/pdf/140_3.pdf](http://www.ide.go.jp/English/Publish/Download/Jrp/pdf/140_3.pdf)
- [5] Berry, C., McNeely, A., Beauregard, K., Dickens, H. & Geddie, I.E. (2009). A Guide to ergonomics. N.C.

- Department of Labor, Occupation Safty and Health Program. Retrieved from www.nclabor.com/osha/etta/indguide/ig33.pdf.
- [6] Haider, Gamage, Afzal, Hur & Siddique (2007). Bench marking study in the garments sector. National productivity organization (NPO) ministry of industry, production and special initiatives government of Pakistan. Retrieved from www.isdb.org/irj/go/km/docs/documents/.../IDB/.../NP O-Pakistan.pdf
 - [7] Hiba, J.C. (1998). *Improving working conditions and productivity in the garment industry* (1st ed.) International labour office, Jeneva.
 - [8] Kumar, A. (2006). Bangladesh: Industrial Chaos Worsens Political Instability. *South Asia Analysis Group, Paper No. 1852*, <http://www.southasiaanalysis.org>, viewed on 05/09/2008.
 - [9] Kashyap, R. & Rawat, A. (2010). Exploring the working conditions and welfare facilities for the workers of apparel industry of Jaipur (Master's thesis, International collage for girls, Jaipur).
 - [10] Kelegama, S., & Epaarachchi, R. (2001). Productivity, competitiveness and job quality in garment industry in Sri Lanka. A discussion paper institute of policy studies of Sri Lanka. Retrieved from [Competitiveness_and_Job_Quality_in_.pdf](http://www.instituteofpolicy.com/Competitiveness_and_Job_Quality_in_.pdf)
 - [11] Mishra, A. (2010). Design and implementation of facility layout and material handling system, (Graduation Project, Technova, Book of Abstracts, National Institute of Fashion Technology, Gandhinagar, Gujarat).
 - [12] Singh, A. & Fatehpuria, A. (2011). Strategizing and building an effective and efficient plant layout, (Graduation Project, Technova, Book of Abstracts, National Institute of Fashion Technology, Gandhinagar, Gujarat).
 - [13] Venugopal, P. Bhaskar, T. & Usha, P. (2011). Employee welfare activities with respective measures in industrial sector –A study an industrial cluster at chitter District. *International Journal of Research in Commerce, IT and Management*. 1, (6), 78-83.
 - [14] Wiyaratn, W. & Watanana, A. (2010). Improvement plant layout using systematic layout planning (SLP) for increased productivity. *World Academy of Science, Engineering and technology*, 72, 373-377. Retrieved from e-journal.uajy.ac.id/6306/7/TI606083.pdf