

Study of Physical Environmental Factors for Long Hours Working in Production Shop

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Abstract

Aim of the paper is to collect the parameters of a better working environment for production shops. Efficiency of a worker to work for long working hours itself increases if he gets a more comfortable physical environment. First of all important physical factors are pointed out and then effort is maintained to get their optimum value to increase comfort conditioning.

Keywords: Comfort, Vendor, Manipulator, Kingpin, Underframe

I. INTRODUCTION

Various factors are responsible to give an optimum environmental conditions to prevail in a production house. Here the environment of heavy engineering division of CIMMCO WAGONS LTD. Bharatpur is studied upon.

II. CIMMCO –OPERATIONS

Sequence of production- First of all raw material is purchased from vendor/past clients like steel etc. Other important articles are also bought like wheels from Railway wheel factory, Bangalore. Brake shoe, kingpin, hub, coupling, slider iron, steel shaft, rods are also bought. Steel sheets are cut/sheared from large plates a German shearing m/c or gas cutting cnc m/c. Railway design standard organization approved drawing is studied and jigs and fixtures, gauges prepared as per requirement of underframes of coach. Using metal inert gas welding with argon and carbon dioxide gas plates are welded to prepare jigs mountable frame. On this frame whole manufacturing process has to be carried out including welding, bending, fitting, and subassembly etc.

All the manufacturing process has to be carried out over ground buried jigs and fixture frame.

Material handling is done using high powered hydraulic wire and chain pulled crane running on over head rails beneath which a set of rails are laid on ground for assembly and movement of underassembled coaches with the help of engine. Welding of under frame is carried out easily by clamping it in huge ring shaped body manipulator turning on pulleys/wheels.

After full assembly of coach over inverted under frame fixed in fixture and mounting of axles, wheel, spring, suspension the coaches are joined using universal coupling and carried to painting store via rails where shot blasting is carried out to make surface susceptible for paint.

A speciality of CIMMCO Ltd is BVZ boggies (Guard boggy).

All m/c are having very high capacities.

After production boggies go for quality inspection for no objection certificate via various methods including radiographic testing, visual inspection etc.

III. ENVIRONMENTAL FACTORS

- Noise level
- Vibration intensity
- Temperature
- Humidity
- Air Quality

A. Explanations:

1) Moisture Content:

Winter condition- Relative humidity <40%

Summer condition-Relative humidity<60%

Most desirable range- 30%-70%

2) Air Quantity:

1-1.5 cubic metre per minute per worker is required in a factory.

3) *Air Motion:*

Air velocity inside workshop < 8-12 metre/minute.

Most desirable-5-8 m/min

Air velocity above the occupied zone should be very high for good distribution of air.

4) *Optimum Effective Temperature:*

Winter-19 degree celcius

Summer-22 degree celcius

5) *Sound Level:*

Level < 60 decibel

Prolonged exposure to sound above 80db (noisy factory) may lose concentration, increase annoyance and may even cause hearing loss.

Further vibration waves of higher intensity and frequency overlap each other causing resonance leading to structural damage and sudden accidents.

6) *Noise Control Strategy:*

- 1) Use damping wooden partitions in factory etc.
- 2) Changing orientation of noisy m/c away from workers
- 3) Cast iron foundation
- 4) Installing m/cs on bases having hydraulic /pneumatic shock absorbing system
- 5) Filling silica sand in workshop floors.

IV. RESULT/CONCLUSION

We recorded the required parameters for better working environment. All the physical quantities are adjusted such that worker can work for long hours.

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