

The welder's chair-for welders suffering from postural problems

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Abstract: Welders at fabrication sites of industries where boiler components are manufactured are suffering from musculoskeletal disorders which is a major reason for absence at workplace. Therefore this chair was developed as a part of ergonomic intervention. This chair tries to eliminate awkward postures which the welders face in long hours of static work.

1.Introduction

The primary cause of absence of welders at fabrication sites of industries where boiler components are manufactured are WMSDs.

The postural problems faced by welders are neck pain due to overhead welding and below eyelevel welding; back ache due to awkward postures as per welding requirements and welding that requires bending of back; knee pain due to long term standing, squatting and awkward below the waist welding requirements.

In addition to the above postural problems the welders also have to face soaring temperature of Indian summers .

The weight of the helmet, apron and materials in hand prove to be an additional burden.

2.Objective

To design a chair as part of ergonomic intervention to minimise the prevalence of WMSDs amongst welders.

3.Factors considered while designing the chair.

The first factor that was considered was adjustable height.Adjustable height was a very essential criteria to bring the work area to eye level.Doing the work at eyelevel prevents major strain that falls on the cervical region of the neck.

The second criteria was adjustable anterior and posterior movement.It was very important to address this point because creating room for the legs is a very key factor for a comfortable posture while working for long hours in a static posture.

The third criteria was an adjustable backrest.It will ensure support to the back throughout the work as well as play a vital role in giving the welder a comfortable posture while doing overhead welding.

The fourth criteria was an adjustable footrest.While working at a height in a sitting



posture the hip, hamstring and the spine are under a lot of stress due to hanging legs. therefore an adjustable footrest was extremely vital to an appropriate ergonomic posture. The fifth and the final criteria was stability. An unstable sitting arrangement can cause more damage than benefit to the welder using it. Fear of falling or an actual fall can damage the good work done by the chair. The above factors were given due weightage while designing the chair.

4. Result

The welder gets to welding at eye level from 0.25 metre above ground till 2 metres above ground. The chair has been designed accordingly with a metal beam on a flat circular iron base. The metal hollow beam has equally spaced square and circular holes alternate adjacent placed. The chair is attached to an iron beam (rectangle shaped) which is inserted into square holes on the attached to the flat iron base. The circular holes are used to insert 1 inch semicircular metal pipes which are used to keep the feet. There is a detachable rod which has adjustable height that can be attached to a facet below the chair for stability in the top three positions. The REBA score was found to be 4. With an arm rest in place and a few minor modifications the score can be even lower.

5. Conclusion

The chair can be used by welders to do long term welding at fabrication sites while sitting is a comfortable position.

The chair is also useful for doing overhead welding at low heights because of the slanting back that gives the welder a comfortable view. It also eliminates postures like standing and squatting which causes postural problems in welders.



Fig. 1 This is the complete view of the welders chair. The sitting part, the central iron beam, the circular base, the foot rest are clearly visible.

In case there are multiple figures to depict a sequence of operation or activities please follow the figure 2 as mentioned below.

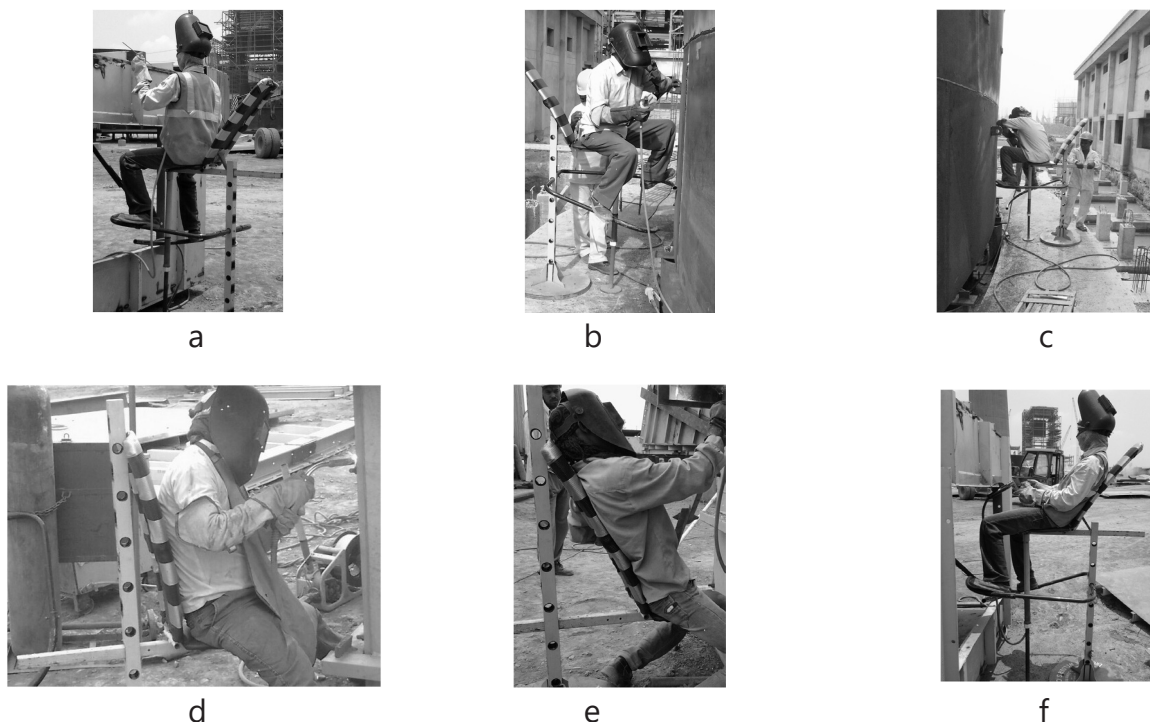


Fig. 2. a – welder getting ready to weld at 1.5m height, b – welder getting ready to weld at 1m height, c – another view of figure b,d-welder welding between 0.25 to 1m,e- welder getting ready to do over head welding,f-welder taking rest after welding.

Future work to be carried out

The major work that needs to be done are attaching wheels at the base to facilitate movement from one place to another, attaching hand rest for a better ergonomic posture. Changes are required in wear resistance. Discomfort analysis also needs to be carried out.

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