



Fabrication of Structural Strength Test Rig For Office Chair.

Akash N. Samarth¹, Dr. S. R. Ikhar²

¹Student, KDK College of Engineering, Rashtrasant Tukdoji Maharaj university, Nagpur, Maharashtra, India
akashsamarth18@gmail.com

²Head of Department, Department of mechanical engineering, KDK College of Engineering, Rashtrasant Tukdoji Maharaj university, Nagpur, Maharashtra, India

Abstract summary the same old is meant to offer producers, and customers a not Unusual basis for comparing the protection, durability, and structural adequacy of preferred-reason office chairs. preferred-reason workplace chairs are generally use in an office environment and can encompass, however aren't limited to the ones seating patterns usually called: government/control, project/secretarial, aspect/visitor chair, nesting folding chairs, tablet arm chair and stools. This widespread describes the manner of comparing wellknown reason workplace chairs, independent of construction materials, manufacturing approaches, mechanical designs or aesthetic designs. This popular does now not address living room seating, flammability, surface material durability, cushioning materials, product emission, or ergonomic concerns. the same old defines specific assessments, the laboratory system that can be used, this situation of assessments, and the minimal reputation tiers for use in evaluating standard motive workplace chairs. The attractiveness ranges and the test parameters given in this popular are primarily based at the actual field use and test experience of BIFMA contributors. where appropriate, the country wide fitness and nutrition exam survey (NHANES) 2007-2010 examine, which indicates the weight of ninety fifth percentile male is 125KG (275 pounds) become used in the improvement of the take a look at.

Keywords— office chair, BIFMA, ergonomics.

I. INTRODUCTION

This check is supposed to provide manufactures, specifiers, and customers with a not unusual foundation for comparing the safety, durability, and structural adequacy of preferred-motive workplace chair. popular-purpose workplace chair are commonly use in an office environment and can encompass, but aren't restrained to the ones seating patterns typically known as: government/control, project/secretarial, facet/visitor chair, nesting folding chairs, tablet arm chair and stools. This standard describes the way of evaluating general motive workplace chairs, unbiased of production materials, production procedures, mechanical designs or aesthetic designs. This standard does not deal with

lounge seating, flammability, surface cloth sturdiness, cushioning substances, product emission, or ergonomic considerations. the same old defines unique exams, the laboratory equipment that can be used, this circumstance of checks, and the minimum popularity levels for use in comparing widespread reason office chairs. The recognition degrees and the test parameters given in this fashionable are based totally on the actual field use and take a look at enjoy of BIFMA members. where suitable, the country wide health and vitamins exam survey (NHANES) 2007-2010 observe, which shows the weight of 95th percentile male is 125KG (275 pounds) became used inside the development of the test. this doesn't means that users with weights above the percentiles referenced cannot competently or quite simply use a chair advanced to a given BIFMA preferred. The check became evolved with an anticipated product lifestyles of ten years based on single-shift usage. Product life can be tormented by the person size/weight, product use, care and renovation, surroundings and others elements and as product compliance to this standard does now not always assure a 10 years product life. The checks on this general are intended to get entry to the performance of the new merchandise only. they are now not intended to get entry to a product that has been in use.

ISO 17025 necessities for measurement uncertainty do no longer follow this widespread.
ISO 17025 necessities for measurement uncertainty do no longer follow this widespread

II. PROBLEM IDENTIFICATION

- There is no way to identify the life of product based on repetitive movement of user while seating.
- Frequency of use is not possible set because we cannot identify the failure.
- Loss of serviceability to chair.

- Design failure mode and effect analysis not possible to conduct
- Manufacturing defect found
- Weighing capacity of chair does not determine.

III. OBJECTIVES

- To develop the structural strength test rig.
- Design the structural strength test rig.
- Validation of Structural strength through test rig.
- To develop CAD model

IV. LITERATURE REVIEW

ANSI/BIFMA X5.1 Office Chairs is typically used to provide safety and performance requirements for chairs that are primarily designed for use in an office environment. Examples include but are not limited to seating styles typically referred to as: executive/management, task/secretarial, side/guest chairs, nesting and/or folding chairs. These chairs are for single occupants and the tests are based on the 95th percentile male body weight (currently 275 lbs.). Chairs may include features such as: stacking, stool, tablet arm.

- ANSI/BIFMA X5.11 Large Occupant Office Chairs is very similar to X5.1 except the tests are based on the 99.5th percentile male body weight (currently 400 lbs.) and the minimum seat width shall be 22 inches.
- ANSI/BIFMA X6.1 Educational Seating offers many tests based on X5.1 but is typically used for seating products that are primarily designed for use in schools (K-12) and colleges/universities. It includes chair-desks, tablet-arm products, convertible bench/tables; in addition to many of the types of chairs and features described in X5.1. This standard provides guidance for three sizes of chairs based on seat height. The small and medium size chairs may be more suitable for K-6 environments catering to smaller users. The large size is based on the 95th percentile male body weight.

provides safety and performance equipments for seating that is primarily designed for use in indoor common or shared spaces such as: waiting, reception, patient rooms, restaurant/dining/cafeteria settings, and other gathering areas. Public seating includes products with single or multiple seat units, arena folding chairs, and standard folding chairs. Public and lounge seating may be ganged or otherwise connected. Seating units that must be attached to the building structure for support or stability purposes are not specifically addressed in this standard (though aspects of this standard may nonetheless be useful). The tests are based on the 95th percentile male body weight.

V. CONSTRUCTION

- After generating all conceptual designs the next step available was to select an appropriate chair design in order to fabricate it.
- The next part was to design the model by using AUTOCAD software.
- After the best concept was selected the next available part was to select each and every part of the model.
- The following parts were selected for manufacturing the model:-

VI. PROBLEM FORMULATION

- The unit base shall be restrained from horizontal movement on test surface shows one acceptance method for restraining the unit. All four corners of the base shall be restrained in both directions.
- If adjustable features are available, all adjustments shall be set at normal use conditions.
- Place a weight of 109 kg (240 lb.) in the center of the seat. If necessary to keep the weight in position, the weight may be secured.
- A cycling device shall be attached to the unit frame midway between front and rear of the seat at the height of the midpoint of the seat frame structure. Note: Where design of the unit does not permit attachment at the midpoint as specified above, a bridging device may be used.
- The cycling device shall be adjusted to apply a “push-pull” action, or alternately may be applied by alternating pull (or push) force application on alternating sides of the unit. One cycle shall consist of one outward force application and removal and one inward force application and removal.
- Apply a force of 334 N (75 lbf.) at an appropriate rate between 10 and 30 cycles per minute. The device shall be cycled for 25,000 cycles

Technical specification

key Dimensions

maximum width -----25”
 maximum depth -----25 - 3/8”
 maximum height -----32 - 3/4”

Seat size

width ----- 20 - 1/4”
 depth -----19”
 height from floor -----18 - 3/8”

Back size

Width -----21"

Height from seat -----17 - 3/4"

Arm size

Distance between arms-----19 - 1/2"

Height from floor -----25 -5/8"

Height from seat -----9"

Width -----2 - 3/8"

Length -----10"



Set up specification

37x37 mm holo rectangular pipe size

Height = 1275 mm --- 4. Nos

Width = 920 mm --- 3. Nos

Length = 920 mm

Metal plate size = 300x145 mm , thickness is 12mm

Wooden sheet size of base plate =920x920 mm , thickness of wooden sheet is 12 mm

Clamping holo rectangular pipe size = 920 mm --- 4. Nos

Mid joint with metal plate holo rectangular pipe size= 835 mm --- 2. Nos

VII. ACTUAL MODEL

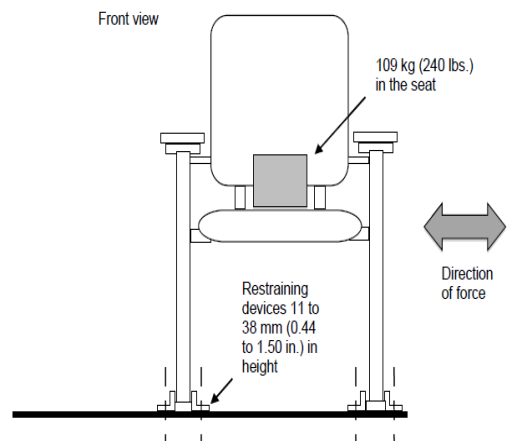


Fig6. A: Actual model

VIII. ADVANTAGES

- Works fast and accurate over the test rig.
- Consumes less time and human effort.
- Adjustable for various sizes of office chair.
- Minimum floor area required to install.

IX. DISADVANTAGES

- Vibrations may occur due to adjustable arrangement.
- Top and bottom surface may no clean properly.
- Chances of motor failure due to continuous operations.

X. CONCLUSION

In the new era of technology, people want something new in their life. They want every single thing they look in front of their life look sophisticated. People want something that can improve their lifestyle and help them to do their job by using the robot or machine. That is why development of machine and robot is now becoming quite popular and faster in marketing. So to help and give benefit to human kind the “Design and Fabrication of particle board cleaning machine” is an alternative machine that can help workers inside the workshop to clean the sheet in an effective way, which will reduce its human efforts and save time.

XI. REFERENCES

- Eckelman, C.A. 1982. using overall performance assessments and first-rate guarantee applications inside the choice of Library Chairs. Library technology reviews: Chicago, united states.
- Eckelman, C.A. 1988. performance checking out of fixtures. element II. A multipurpose popular structural performance check technique.
- Eckelman, C.A. 1995 a. Library Chairs: an outline of the ALA check method with check reports on aspect Chairs. Library technology reports 31(2): 115-214.
- Eckelman, C.A. 1995 b. performance take a look at concepts. Library generation reports March/April. 124-151.
- Eckelman, C.A. 2003. text e-book of Product Engineering and strength layout of fixtures. Purdue university: West Lafayette, Indiana, america, 65-67.
- wooded area products Laboratory. USDA. 2010. wooden guide: timber as an Engineering material. popular Technical record. USDA. wooded area merchandise Laboratory: u.s.a.. <https://doi.org/10.2737/FPL-GTR-113>
- Gustafsson, S.I. 1995. fixtures design by using use of the finite detail technique. Eur J timber Prod 3(4): 257-260. <https://doi.org/10.1007/s001070050084>
- Kasal, A.; Birgul, R.; Erdil, Y.Z. 2006. dedication of the power overall performance of chair frames built of stable wood and wood composites. For Prod J fifty six(7-8): fifty five-60.
- Kasal, A.; Kuşkun, T.; Haviarova, E.; Erdil, Y.Z. 2016 a. Static the front to again Loading potential of timber Chairs and dating among Chair electricity and character Joint power. BioResources eleven(4): 9359-9372.