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A Chair Assessment Model for Organizational Benefit, Safety, and Asset Management

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Author Note: Alison Heller-Ono, President/CEO and Senior Ergonomics Consultant (PT, CPE) works alongside clients to use ergonomics as a medium to drive change within their organization to positively impact employee health, comfort, productivity, and ultimately work-life quality. Ms. Heller-Ono speaks nationally and internationally on workers' compensation, work injury prevention and management, ergonomics (process design and management) and the ADA. She is the author of "Your Guide to Developing an Ergonomic Process", "Your Guide to Office Ergonomic Furniture and Accessories", and has authored over 35 articles on ergonomics, work injury prevention and management. Alison has also served as an expert witness for workers' compensation and ADA cases in California.

Alison received her BA in Biology in 1984, followed by her MS in Physical Therapy in 1987 and worked as a clinical physical therapist until 1996 helping work-injured patients get back to work. Alison become a board Certified Industrial Ergonomist (CIE) in 1996 as well as a Certified Disability Analyst (CDA) by the American Board of Disability Analysts. She has been a Certified Management Consultant (CMC) through the Institute for Management Consultants (IMC) since 2001. In 2009, she became a Certified Professional Ergonomist (CPE) through the Board of Certified Professional Ergonomists (BCPE). Ms. Heller-Ono earned her Certified Professional Disability Manager (CPDM) credential as well.

Abstract: The ergonomic office chair is the most important "work tool" determining a worker's seated productivity in conjunction with the computer (and workstation). It can be said the chair is foundational to good seated workstation ergonomics. Yet, the office task chair is so misunderstood, undervalued and probably the least appreciated asset employers' purchase. Until now, there has never been a way to inventory and measure chair quality and competency for ongoing use in the workplace. The goal of the chair assessment system (CAS) model is to help employers manage their chair assets as a system by providing an objective measure to determine whether to keep, repair or replace chairs and then fit employees for ongoing safety, comfort and productivity.

Keywords: chair assessment system, chair life cycle, chair systems, ergonomic task chair, life cycle, predictive analytics, safety

1. Introduction

Few employers, if any, use an organizational or systems approach to managing chairs as an asset in the workplace. In addition, employers do not recognize or track when employee chairs are at the end of their life cycle (Figure 1) keeping them far too long, exposing themselves and their employees to increased liability, reduced productivity and increased risk for seated musculoskeletal disorders leading to workers' compensation claims.

The problem is a combination of both employer and employee lack of awareness and understanding of the value and importance of ergonomic chairs in the workplace. Starting with how to select chairs for the workforce and demonstrable willingness to invest in quality chairs as an important asset that contributes to employee health and productivity.

Missing is an objective methodology regarding how to determine whether to keep, repair or replace and fit office task chairs once they are in the workplace. The tests in ANSI/BIFMA X5.1 -2017 Office Chairs standard are intended to assess the performance of new products only. They are not intended to assess a product that has been in use. Essentially, there is no way to objectively assess a chair through its lifecycle to identify proactively when to repair it before the warranty ends or when to remove it from circulation before catastrophic failure.

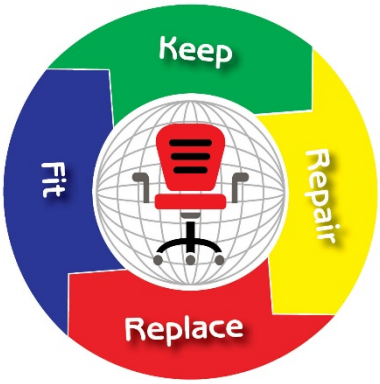

Figure 1. The Chair Life Cycle model developed by Worksite International, Inc.

The furniture industry has developed widely accepted ergonomic guidelines for new chairs. Most notable are the BIFMA G1 - 2013 Ergonomics Guideline - Ultimate Test for Fit and the newly released ANSI/BIFMA X5.1 - 2017 Office Chairs. These guidelines are intended to standardize on chair safety and design so they fit most individuals. The standard defines specific tests, the laboratory equipment that may be used, the conditions of tests, and the minimum acceptance levels to be used in evaluating general-purpose office chairs. However, there is no system in place to evaluate chairs once they are brought into and used over time in the workplace.

2. Methods

Research was conducted over a 6-year period from 2010-2016 to develop a chair assessment system (CAS) model to coincide with the ergonomic chair life cycle (keep, repair, replace and fit). The CAS consists of an Excel data table and an Excel assessment tool along with a chair fitting form to offer predictive analytics for chair decision makers.

After the initial idea was developed and applied in a large organization, additional trials were performed over the last 2 years to test, validate and improve the CAS Excel tool design and functionality. To utilize the CAS, each appropriate chair in the work area is evaluated (inspected) using 6 primary criteria. A chair ID is established combined with other identification to include name of end user, location of chair, department and date of assessment. The chair manufacturer, name or chair model, date of manufacturing or shipping date and number of shifts the chair is used. The primary criteria assessed include:

1. Age of chair
2. Shifts used
3. Cushion and Fabric Quality
4. Operational Mechanics
5. Chair Comfort (perceived)
6. Overall Quality and Competency

Criteria 3-6 require the evaluator to rate the chair based on a three-point rating scale of good, fair or poor following inspection and observation of each criteria. Whenever possible, the end user participates in selecting the chair perceived comfort rating. Criteria 3-6 offers descriptive terms to select from that best describes the condition of the chair at the time. The information is entered onto the Chair Assessment Tool (CAT), which is then input to the Chair Assessment System Excel sheet for calculation using a proprietary algorithm to determine the score of the chair. For easy scoring, the algorithm is translated to three responses:

1. Keep the chair
2. Repair the chair
3. Replace the chair (then fit for a new chair)

Each chair score is color coded on the CAS Excel datasheet. A dashboard is created automatically for further sorting of the data to give the employer a better sense of the quality and competency of their chairs by manufacturer and by location/department.

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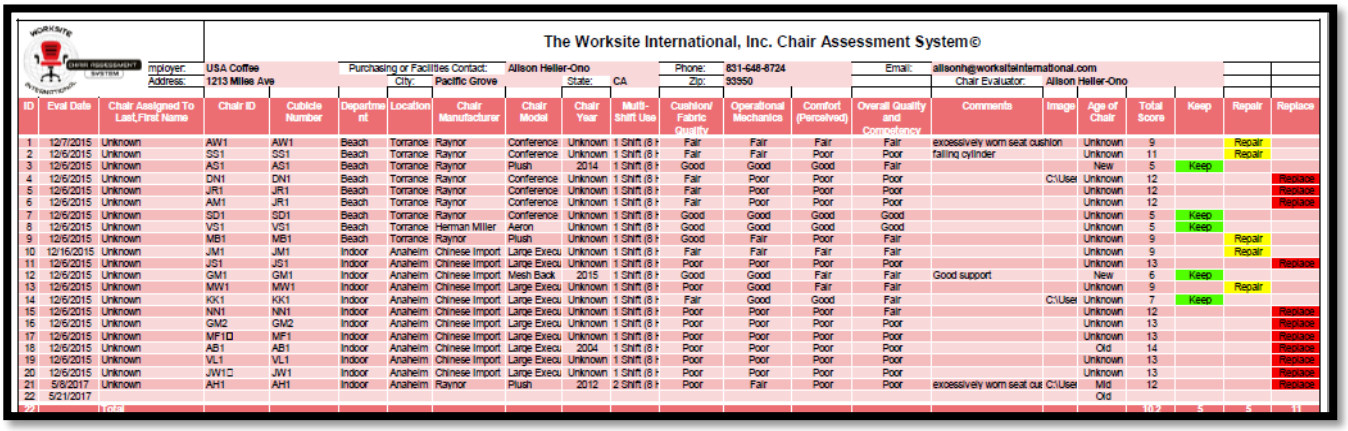
3. Results

As an example, a small company participated in using the CAS. Select chairs were evaluated using the criteria described above to inventory and assess chair quality and competency to provide the employer with the information needed to determine which chairs can remain in operation, which need to be repaired (while under warranty) and which should be removed due to risk of failure or harm to the user.

The CAS Excel spreadsheet (Figure 2) is presented below as an example of an organization (USA Coffee) with 21 employees using a variety of chairs. Data is entered on the Chair Assessment Tool (not shown) and then imported into the CAS Excel database to track chair inventory, quality and competency of each chair assessed. Chairs in poor condition based on the categories described above are shown in red. Chairs in fair condition that would benefit with some degree of repair and are likely still under warranty are shown in yellow. New chairs and chairs continuing to be in good condition overall with little concern are shown in green.

The CAS database is also translated into a color-coded dashboard (Figure 3) to act as a visual interface that provides at-a-glance views into key measures relevant to the type of chairs the employer has, the location of the chairs and the quality and sustainability of the chairs. The CAS dashboard provides visualization to help focus attention on key trends, comparisons, and exceptions regarding the chair asset management program.



The Worksite International, Inc. Chair Assessment System©

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ID	Eval Date	Chair Assigned To Last,First Name	Chair ID	Cubicle Number	Department	Location	Chair Manufacturer	Chair Model	Chair Year	Multi-Shift Use	Cushion/ Fabric Quality	Operational Mechanics	Comfort (Perceived)	Overall Quality and Competency	Comments	Image	Age of Chair	Total Score	Keep	Repair	Replace
1	12/7/2015	Unknown	AW1	AW1	Beach	Torrance	Raynor	Conference	Unknown	1 Shift (8 h	Fair	Fair	Fair	Fair	excessively worn seat cushion		Unknown	9		Repair	
2	12/6/2015	Unknown	SS1	SS1	Beach	Torrance	Raynor	Conference	Unknown	1 Shift (8 h	Fair	Fair	Poor	Poor	failing cylinder		Unknown	11		Repair	
3	12/6/2015	Unknown	AS1	AS1	Beach	Torrance	Raynor	Plush	2014	1 Shift (8 h	Good	Good	Good	Fair			New	5	Keep		
4	12/6/2015	Unknown	DN1	DN1	Beach	Torrance	Raynor	Conference	Unknown	1 Shift (8 h	Fair	Poor	Poor	Poor		C:\User	Unknown	12			Replace
5	12/6/2015	Unknown	JR1	JR1	Beach	Torrance	Raynor	Conference	Unknown	1 Shift (8 h	Fair	Poor	Poor	Poor			Unknown	12			Replace
6	12/6/2015	Unknown	AM1	JR1	Beach	Torrance	Raynor	Conference	Unknown	1 Shift (8 h	Fair	Poor	Poor	Poor			Unknown	12			Replace
7	12/6/2015	Unknown	SD1	SD1	Beach	Torrance	Raynor	Conference	Unknown	1 Shift (8 h	Good	Good	Good	Good			Unknown	5	Keep		
8	12/6/2015	Unknown	VS1	VS1	Beach	Torrance	Herman Miller	Aeron	Unknown	1 Shift (8 h	Good	Good	Good	Good			Unknown	5	Keep		
9	12/6/2015	Unknown	MB1	MB1	Beach	Torrance	Raynor	Plush	Unknown	1 Shift (8 h	Good	Fair	Poor	Fair			Unknown	9		Repair	
10	12/16/2015	Unknown	JM1	JM1	Indoor	Anaheim	Chinese Import	Large Execu	Unknown	1 Shift (8 h	Fair	Fair	Fair	Fair			Unknown	9		Repair	
11	12/6/2015	Unknown	JS1	JS1	Indoor	Anaheim	Chinese Import	Large Execu	Unknown	1 Shift (8 h	Poor	Poor	Poor	Poor			Unknown	13			Replace
12	12/6/2015	Unknown	GM1	GM1	Indoor	Anaheim	Chinese Import	Mesh Back	2015	1 Shift (8 h	Good	Good	Fair	Fair	Good support		New	6	Keep		
13	12/6/2015	Unknown	MW1	MW1	Indoor	Anaheim	Chinese Import	Large Execu	Unknown	1 Shift (8 h	Poor	Good	Fair	Fair			Unknown	9		Repair	
14	12/6/2015	Unknown	KK1	KK1	Indoor	Anaheim	Chinese Import	Large Execu	Unknown	1 Shift (8 h	Fair	Good	Good	Fair		C:\User	Unknown	7	Keep		
15	12/6/2015	Unknown	NN1	NN1	Indoor	Anaheim	Chinese Import	Large Execu	Unknown	1 Shift (8 h	Poor	Poor	Poor	Fair			Unknown	12			Replace
16	12/6/2015	Unknown	GM2	GM2	Indoor	Anaheim	Chinese Import	Large Execu	Unknown	1 Shift (8 h	Poor	Poor	Poor	Poor			Unknown	13			Replace
17	12/6/2015	Unknown	MF1□	MF1	Indoor	Anaheim	Chinese Import	Large Execu	Unknown	1 Shift (8 h	Poor	Poor	Poor	Poor			Unknown	13			Replace
18	12/6/2015	Unknown	AB1	AB1	Indoor	Anaheim	Chinese Import	Large Execu	2004	1 Shift (8 h	Poor	Poor	Poor	Poor			Old	14			Replace
19	12/6/2015	Unknown	VL1	VL1	Indoor	Anaheim	Chinese Import	Large Execu	Unknown	1 Shift (8 h	Poor	Poor	Poor	Poor			Unknown	13			Replace
20	12/6/2015	Unknown	JW1□	JW1	Indoor	Anaheim	Chinese Import	Large Execu	Unknown	1 Shift (8 h	Poor	Poor	Poor	Poor			Unknown	13			Replace
21	5/8/2017	Unknown	AH1	AH1	Indoor	Anaheim	Raynor	Plush	2012	2 Shift (8 h	Poor	Fair	Poor	Poor	excessively worn seat cus	C:\User	Mid	12			Replace
22	5/21/2017																Old				

Figure 2. The Chair Assessment System Excel database.

The CAS dashboard identifies at least twelve chair trends for anyone in the organization who needs to be aware of and manage the chair fleet program. This might include safety and risk managers, EH&S, facility managers, purchasing managers, budget managers, ergonomics teams and others in the organization with an interest in understanding the state of chair asset management relative to employee health, safety and productivity. The CAS dashboard identifies trends in:

- The number of chairs by manufacturer/model type
- Assessment totals and the number to keep, repair and replace
- Assessment totals by department/location
- Age of chair by manufacturer/model
- Cushion/Fabric quality by manufacture/model and by department/location
- Operational mechanics quality by manufacture/model and by department/location
- Comfort (perceived) by manufacture/model and by department/location
- Overall quality by manufacture/model and by department/location

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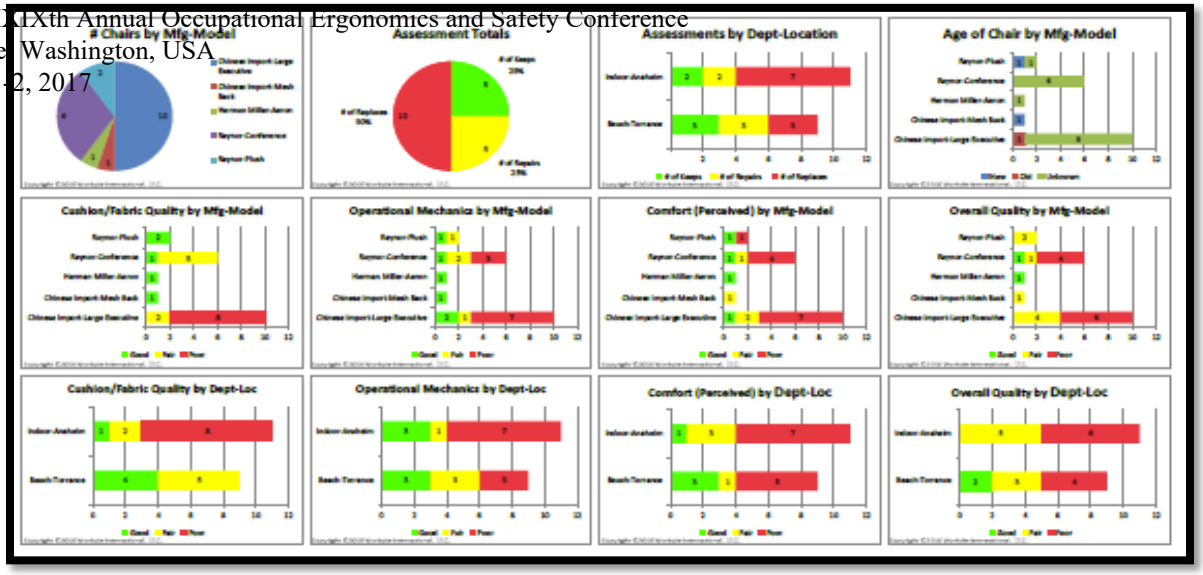

Figure 3. The Chair Assessment System dashboard helps to focus attention on key trends, comparisons and exceptions in the chair fleet.

4. Discussion

Using the example company (USA Coffee), the employer can specifically identify chair concerns by person, by department and by location which chairs are holding up the best, which are perceived as most comfortable, which require repair and or replacement and many other trends, comparisons and exceptions in their chair program. Chairs scored in the green were acceptable for ongoing use. Chairs scored in yellow indicate they needed some degree of repair under warranty (as applicable). Chairs scored in the red, allowed the employer to identify the chair for removal, to effectively budget for replacement and perform a chair fitting with the employee.

The Chair Assessment System easily removes bias from a process often riddled with favoritism or some degree of workplace social hierarchy where certain employees receive new chairs because of status in the organization, a work injury or because their neighbor received a chair. While it may be appropriate to provide new chairs in some circumstances, many times, the current chair simply is not adjusted correctly or set for best fit. Inventorying and assessing the chair for comfort and fit is part of the chair asset management process.

The CAS helps to identify based on objective, measurable evidence whether to keep, repair or replace a chair and then fit for a new one because it has reached the end of its lifecycle or offers an inadequate fit. Through the inventory process, employees learn about the features and functions of their chairs, how to adjust for fit and comfort as well as determine if the chair is a poor fit for them.

Furthermore, this system helps employers to see what chairs are working well for the organization by looking at the perceived comfort of the ratings; further helping to assign chairs more effectively, rather than the “willy-nilly” approach employers typically apply. For example, the petite female in the large, oversized chair and the large male or obese employee in a significantly undersized chair. Typically, there is no rhyme or reason behind the mismatch of chairs in an organization, especially those with multiple types and sizes of chairs accumulated over time.

Most importantly, the CAS identifies when a chair needs repair or is at the end of its lifecycle and should be removed from operation. This is a critical issue as chair cylinders are likely to fail (begins to sink or rise and fall on its own) over time when not properly maintained or the chair exceeds its use time (beyond warranty), adversely affecting employee ergonomics, posture and comfort at the workstation. Employers routinely leave “money on the table” because they rarely effectively use the chair warranty as it is described and intended to repair or replace parts.

A good ergonomic chair is an investment costing on average between $350.00 and $850.00 and expected to last approximately 10 years or more. Investment in the chair assessment system costs literally pennies per chair compared to investing in a new chair, especially when it is not necessary. Employers routinely discard chairs perceived as broken or a poor fit simply because they don’t understand how to adjust or use the chair properly; fail to use the warranty or select incorrect chairs for employees.

It is estimated utilizing the chair warranty has an expected cost saving of at least 50% over buying a new chair. By repairing an existing chair as part of a preventive maintenance program, it extends the life of a good quality chair another 3-5 years that would have otherwise been determined to be replaced without the CAS data. It does take time to evaluate and document the status of each chair. A chair assessment takes approximately 6 minutes using the CAT followed by brief data entry into the CAS Excel sheet. This time is well spent given the outcome. In regards to cost-benefit, the chair assessment

system is an affordable, asset management strategy designed to optimize operational chair performance, minimize whole life costs and support an organization's corporate health and safety goals.

5. Conclusion

Based on numerous trials in the workplace, feedback from industry leaders and practitioners, the chair assessment system provides practical and informative, predictive analytical data in a simple and easy to use format allowing employers to better understand chairs as a system. The CAS shows how employers must take the time to inventory and assess task chairs for safety, health and productivity impact.

The chair assessment system is an effective way to assure employee seated work health and chair satisfaction through the life cycle of chair use. Using an inventory and asset management system to measure task chair quality and competency helps employers and practitioners determine the most effective chairs in the workplace, which need to be repaired and which should be replaced to minimize risk, liability and exposure to seated work discomfort. By doing so, thousands of dollars can be saved by reducing work injuries and improving employee health and productivity.

For more information about the Chair Assessment System described in this paper, please contact Worksite International, Inc. at http://www.worksiteinternational.com/Chair-Assessment-System.html.

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