

Innovative Design of Lecture Hall Seating

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Abstract

At present, the lecture hall seats are in a wide variety of shapes and used in a wide range, and are used in a large number of lecture halls, cinemas, theaters, etc.. Most seats automatically fold the cushions up when no one is using them in order to save space. Thus, the limited row distance in the expansion of more space for people to walk through. But the way the seat is folded is not convenient under certain conditions. How to simplify the steps when entering the seat. When seating, people usually use their hands to unfold the cushion, then turn around and sit down. Assuming that both hands are holding an object, the cushion can't be unfolded, and this seemingly ordinary operation becomes more inconvenient. It is not convenient to give up space when someone passes on the side. After seating, when someone on the side needs to pass, it is not possible to move backward to make space. You have to stand up and wait for the cushion to fold up before you can step back and make way. This process takes some time and ruins the viewing experience. This project is to improve the comfort of the lecture hall seats, combined with people's habits, the appearance and structure of the lecture hall seats design.

Keywords

Folding seat; Product shape design; Comfort; Convenience.

1. Research Background

1.1. Market Research

The use of lecture hall seats is very wide, in the lecture hall, cinema, auditorium and other places have its figure. It is a furniture with great demand in the market, and there are many manufacturers producing this type of seats in China, and there are countless types of lecture hall seats produced. Lecture hall seats not only combine function, form, structure and details to meet the various needs of users. And to create a neat and beautiful, flexible and efficient meeting space. Can be diverse, with easy, ergonomic, so that every inch of space to maximize the effectiveness. In the image can also reflect the efficient, unified and other characteristics of the venue, to enhance people's experience of attending the meeting.

However, the preliminary research found that the market today, the function of the lecture hall seat is quite a lot, but by and large by the seat, back, armrests and feet four parts, the cushion folding structure is quite single, are along the axis point upward folding, in the use of always users complain in the get up to give way and landing is not convenient. If the existing lecture hall chairs are improved according to these two directions, it will effectively improve people's experience, so there is a need and value for the design in these two aspects.

1.2. Market Research

Most of the seats in the lecture hall are in the form of sofa-type cushions, and for the convenience of evacuating people when the venue is dispersed, the cushions are mostly reversible structure. Some seats even place documents and writing boards for recording according to the use and design needs of the site, and special lecture halls also require consideration of simultaneous translation equipment and voting and speaking equipment; some theaters or halls also require seats and air conditioning systems to match.

Although the function of the lecture hall seat is quite a lot, but by and large by the seat, armrests and feet four parts, the cushion folding structure is quite a single, are along the axis point upward folding. The structure form is shown in Figure 1 and the standards applicable to public seating are "public seating in theaters" and its related standards.

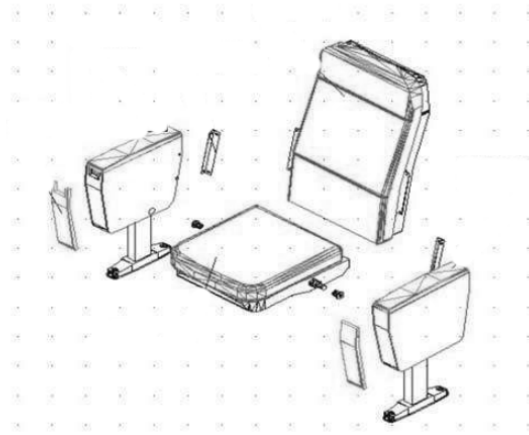


Figure 1. Traditional lecture hall seating structure

2. Design Ideas

2.1. Problem Analysis

2.1.1 How to solve the cushion need to turn around and break down

After people enter the venue or cinema, they need to turn around and break down the seat before walking to their own, and then turn around and sit down again with their hands against the cushion. How to change the cushion folding structure to help people eliminate this step and make their experience better.

2.1.2 How to make it more convenient and efficient for people to give up their seats

After all the people have been seated, if the people who are seated in the middle position need to leave, because the aisle is narrow at this time, everyone in the route of their departure has to get up and give way. How to change the trajectory of the cushion to make this action more convenient and efficient, as far as possible to reduce the impact on the people who give up their seats [1].

2.2. Situation Analysis of Lecture Hall Seats

The two stages of "getting up" and "taking a seat" are not in line with the human-computer relationship, and the experience of using the seat is not good. The redesigned cushion folding structure can solve this problem [2].

3. Lecture Hall Seating Design Scheme Display

3.1. Lecture Hall Seat Modeling Function Display

3.1.1 Reproduction of the lecture hall seating situation

After the opening of the movie, people enter one after another, and some people hold drinks and popcorn in their left and right hands respectively. After finding their own position, they sit directly on the upper extension of the cushion, which will slide out according to the movement of the hips, without encroaching on the space and eliminating the need to turn down the steps with their hands when sitting down, and just sit down. When giving way to people passing on both sides, you don't have to change your own center of gravity, just stand up. Because the

cushion and the back of the chair are set on the slide rail, it changes the posture of the cushion when it is folded, instead of turning it upward, it is folded backward.

3.1.2 Main functional components of the lecture hall seat display

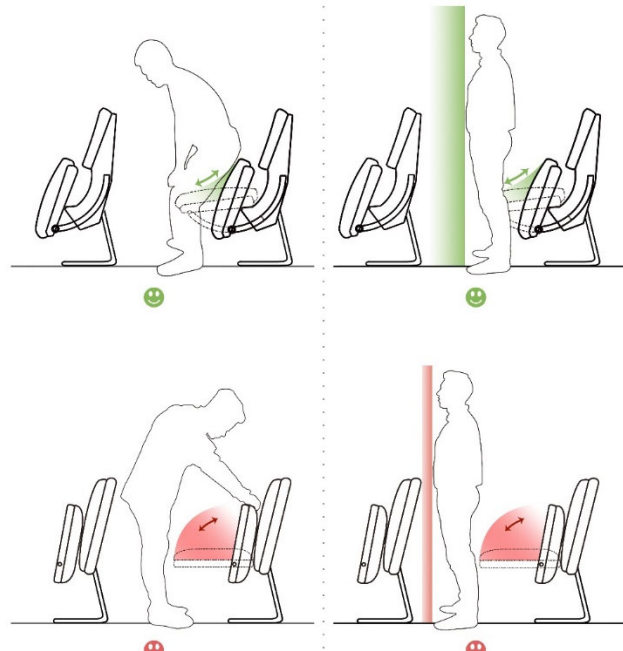


Figure 2. Situational analysis of lecture hall seating use

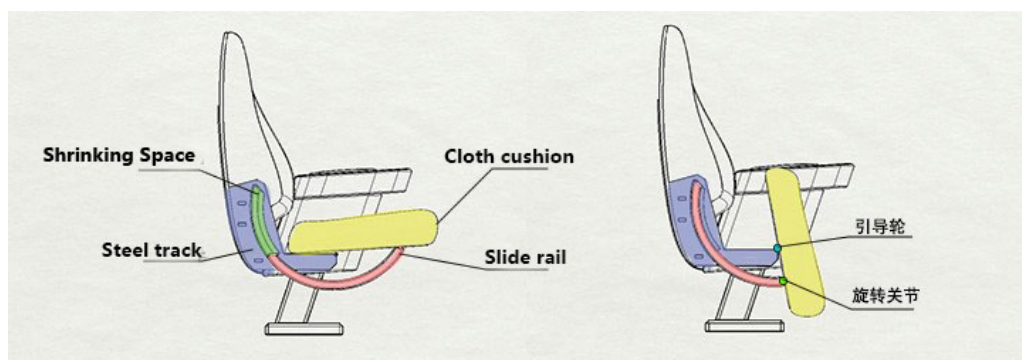


Figure 3. Showing the functional components of the lecture hall seats

3.2. Lecture Hall Seat Modeling Innovation Design Demonstration

3.2.1 Design task

To make a design breakthrough in the traditional way of seating and giving way, to upgrade and optimize the traditional lecture hall seating, to make full use of and conform to the mechanics and ergonomics principles, to be easy to operate, practical and beautiful, and to be applied in many places.

3.2.2 Definition of lecture hall seat innovative design modeling

In terms of the appearance modeling of the lecture hall seat, the modeling in the lecture hall seat program is improved several times, from which a suitable modeling solution is selected. Therefore, the external shape of the product is modified, and the back of the chair adopts egg-shaped curve, and the round and smooth shape gives people a rich sense of wrapping in visual aspect. The backrest and cushion are padded with elastic sponge under the skin, which is elastic and in line with the human body structure, making it more comfortable to sit. The armrest is a rounded rectangular shape with a forward angle, with a tendency to leap forward, reflecting

the pioneering and dynamic design ideas, and there are soft wrist rests and cup holders on the top of the armrest, intended to improve the comfort and convenience of use[3].

3.2.3 Color definition of innovative design of lecture hall seat

Combined with the design of egg-shaped appearance, based on the theory of design psychology and color composition, and taking into account the use of people and the environment, the color scheme of gray-blue and light pink is designed to be fashionable and fresh. The color scheme can also be adjusted according to the specific use scenario.

3.2.4 Multi-angle effect display of lecture hall seats



Figure 4. Innovative design of lecture hall chairs with multi-angle effect display chart

3.3. Description of Lecture Hall Seating Design

In order to simplify the steps when entering the seat, and to solve the problem of inconvenience when someone passes the side to make space. The folding structure of the cushion is redesigned, with sliding rails on the cushion and back to change the posture of the cushion when it is folded. Instead of turning up, it is folded backwards. Not only does not encroach on space, but also eliminates the need to turn down the steps by hand when sitting down, directly sit down.



Figure 5. Exhibition board display of innovative design of lecture hall seats

3.4. Technical Description of Lecture Hall Seats

The innovative design of the special structure of the lecture hall seat overturns the traditional way of using the lecture hall seat. The addition of the slide rail changes the direction of the force of the cushion and makes the use more labor-saving and barrier-free. The design of single slide rail avoids the synchronization problem of double slide rail. The use of high-density cold foam foam, a higher level of comfort. The addition of armrest pad and cup holder, comfortable and convenient. Double color design, the visual perception of fashion and fresh. Spring reset plus steel frame reset structure, no return noise. Tripod and slide structure using high-quality 2MM cold-rolled steel punching and welding shape, reliable and stable. The use of advanced special fabric, flame retardant, stain-resistant, anti-fading. Internal use of rust-proof electrostatic spraying hexagonal expansion screws, no rust.

3.5. Difficulties of Lecture Hall Seat Design

In order to be able to complete the design goals, it is necessary to add new slide rails in the seat, and it is necessary to reserve the contraction space of the slide rails in the seat. The human body will cause the seat surface center of gravity to change after falling into the seat, and the position of the steering joints and guide wheels need to be adjusted repeatedly and verified several times to come up with a seat structure layout that we think is appropriate.

4. Conclusion

Traditional lecture hall seating is widely used, in lecture halls, cinemas, auditoriums and other places. However, there are still imperfections in individual use environments. Therefore, the focus of this project is to improve the human-computer interaction solution of the chair. In addition to the basic functions of the lecture hall chairs, the emergence of lecture hall chairs that improve the experience of people getting up and giving up their seats will greatly improve people's comfort and market competitiveness. This project starts from the core demand of improving the comfort of use, and the innovative design of the lecture hall seat is based on the core problems of difficulty in getting up and inconvenience in getting down, thinking about the way of folding the cushion and the trajectory of movement. In the process of design, the design was modified several times. Gradually understand the main components of the lecture hall seat, folding structure, modeling design and other industry knowledge, especially the understanding of the human-machine size and a profound experience in the design of the movable structure. On the basis of solving the problem of optimizing the use of man-machine, we have made a lot of attempts in the design of product shape and the matching of color and material, and finally got the existing scheme.

Acknowledgments

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