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Research Article

Method of Humanity Design for Food Machinery

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Abstract: In view of the humanity design problem of the existing food machinery, the author states her own personal design idea. So the author makes an exploration on method of humanity design for components of food machinery, including the monitor, the console, the control device and protection device. At last, several key points that must be followed by the humanity design of the color of food machinery have been pointed out.

Keywords: Color design, food machinery, humanity design

INTRODUCTION

It is can be discovered from the successive international exhibition of food machinery that the food machinery designed excellently, has already got away from the ice-cold and mechanical "not friendly" feature and got away from the characteristic of disobeying person's nature and becomes more friendly, more sweet and more according with physiology and mental need of modern people. It is inevitable trend that food machinery develops facing humanization direction (Yang *et al*., 2003). Therefore, studying the method of humanity design for food machinery is a topic which has important theoretical meaning and realistic meaning (Jiang, 2011).

Though our food machinery already has a very big development and in the function design, has gradually approached the advanced level in the world (Jiang and Du, 2012). But in the humanization design, our food machinery still exists a lot of problems, for example, neglecting humanized require for the modeling design of food machinery, so that our food machinery exists numerous problems, such as the body is huge and bulky, the color is monotonous and dull, the display device is not easy to observe, the control system lacks man-machine nature and is inconvenient to operate (Jiang, 2013). Although many food machineries have the same function as the foreign ones, they could not reach the same market competition ability (Liang, 2003). Therefore, studying the method of humanity design for food machinery has already become an urgent problem in the manufacturing industry of food machinery (Jiang and Cheng, 2010).

The main purpose of the research is to investigate an effective method of humanity design for food machinery, thereby raising the external appearance quality and pleasant of food machinery, strengthening additional value and whole shape effect of product, satisfying the demand of market competition and creating higher economic efficiency.

MATERIALS AND METHODS

Method of humanity design for components of food machinery: With the progress of the age and the improvement of people's appreciation ability of the beauty, it presents higher request to food machinery, that is, the food machinery should not only have high-tech function and good function, but also have a pleasant effect which makes person feel work delightful, decreases tired and pleases the eye. Therefore, the color and material choice of food machinery effects the whole felling which food machinery gives person. The good console design can make the operator quickly identify and can't take place a mistake operation and ensure accuracy and efficiency, comfort and convenience of operation. The number monitor put inside the normal scope of vision can raise the accuracy and efficiency of recognizing and reading and can also ease the vision tiring for a long time watching.

Monitor design: No matter what monitor, wants to attain to provide accurate, quick and convenient vision information, of which the design should accord to the person's vision characteristic and conducts according to the best observation fashion of person. Raising the accuracy and efficiency of recognizing and reading, the better vision distance of monitor and person is in the scope of 560~750 mm, which can ease the vision tiring for a long time watching and be easy to observe for operator and can attain quick and accurate control when delivering the information to person.

Console design: In console design, the key is that the arrangement of the console and monitor should be located in the normal scope of operation space, ensuring that the operator could well observe the necessary

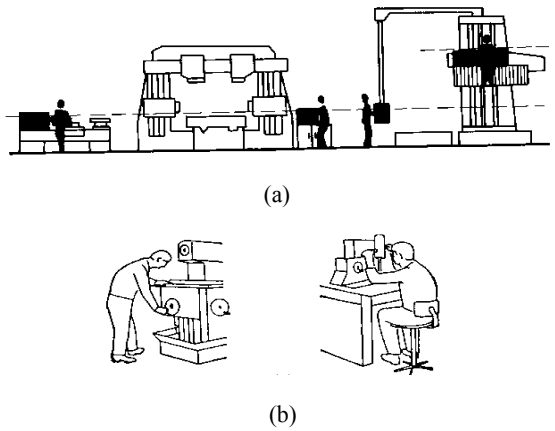

Fig. 1: Relationship of food machinery and human body scale

monitor, operate all the controllers and provide comfortable operation posture for long-term operation. Sometimes, the console also has operation area at the side before operator; certainly all these districts have to be within the area of seeing and reaching. Therefore, the design of console height and work zone should accord to the person's size parameter and machine mechanics parameter, sufficiently considering the influence of food machinery upon the person, reasonably choosing various parameter and making person easy to operate, not tired and easy to observe process situation, which builds up a kind of best working environment.

Design of control device: The control device which converts the operator's output signal into the machine's input signal is a device that transports the person's information to the machine, in order to adjust and change the machine status. Therefore, the design of control device firstly should sufficiently consider the figure, the physiology the mental state, the physical strength and the ability of operator. The size and shape of control device should adapt to the sport characteristic of the person's hand or feet and the strength scope should be placed in the best scope of human body strength, could not outrun the extreme limit t of human body strength. The important or using frequently control device should arrange in the space scope where the person's responding is the most sensitive, the operation is the most convenient and the body could attain. The design of control device still needs to consider enduring nature, revolve speed, external appearance and energy consuming. The control device is an important constituent part in man-machine system, of which the design whether proper, relates to the normal safety movement of the whole system (Zhan, 1999), as shown in Fig. 1.

Design of protection device: Protection device, which exclusively provides a safe protection by the object obstacle, which includes machine hull, cover, screen, door, lid, close type device and others, is a constituent part of food machinery. The protection device could be used alone, as well as be used through uniting with allied lock device together. If used alone, only when closed, can it have a protection function; if used through uniting with allied lock device together, no matter what positions, it could have a protection function.

Method of humanity design for the color of food machinery: The color design is an important constituent part of the modeling design of food machinery, as color has more ocular, more strong and more attractive magic power than the body. The color could firstly influence the person's sense organs than the body, moreover, that could raise operator recognizing and watching degree to some operation controls, show instrument and appearance by making use of vision recognizing effect and psychology of color, sequentially, the function of these device could be well developed and the mental request of operator could be satisfied and the work efficiency could be enhanced, in the meantime, the occurrence of production could be also reduced. The humanity design of the color of food machinery should follow the following few important points.

Satisfy the request of man-machine coordination: The color design of food machinery should well embody the relation of man-machine coordination, so as to make operator's mood pleasant, have a sense of security, don't easily produce fatigue and then attain to the purpose of operating accurately and enhancing production efficiency. For example, generally, the base and body of food machinery properly adopt heavy and solid deep color, not only bearing dirty but also making person have the dependable sense of stability to machine. The workbench, sliding plate and other parts are the components that person usually use, which properly adopt bright color, so as to get rid of depressed feeling, satisfying the request of operating accurately and man-machine coordination, as shown in Fig. 2.

Satisfy the request of environment and function: The color should well express the function characteristic of product and mutually coordinate with the use environment. If the greasy dirt of use environment is serious, usually the dark color is proper for bearing greasy dirt. The color of the panel of food machinery generally properly use the neutral base color of low bright degree and low pure degree, contrasting with component color, so as to enhance the vision recognizing degree. The panel should have no strong reflection and dazzle light. The color of display part should be obvious and refreshing, but not dazzle eye. The color of caution part should be fresh and gorgeous to come into notice and the color of concealment part should be quiet, as shown in Fig. 3.

Value the choice of tone: The choice of main tone of food machinery is a problem of very importance; the different tone will form different art effect. In matching color of food machinery, having main tone can seem to

Fig. 2: Food machinery

Fig. 3: Dicing machine

be to unify. The color is more little, the main body characteristic is more strong, the decorate characteristic is more good and the external form relation of food machinery is more unify. Contrary, the color matches more much, causing the color more disorderly, so that it is difficult to adjust generally, the main body characteristic is unclear and the harmonious effect is broken.

The choice of tone still needs to notice whether unique beauty. It needs to hold tight people's mental request for the color of food machinery, transform the tone of food machinery to make it produce an unusual attraction, in the meantime, increase the category of tone to satisfy people's fondness for different colors.

Moreover, the base, the body and other big pieces of food machinery are suit able to use a low pure degree color as them a in body color and use clear, elegant and clean color to unify overall situation to make the main tone definite. Using little area of high purity color to embellish to make the whole seem to be abundant, change and organic. The whole color generally uses monochrome or two sets of colors, not more than three sets of colors (Fu, 2002).

Notice novelty: The color design of food machinery should notice novelty and creativity to make it have vitality and more competitiveness. The color of food machinery not only can satisfy the request for appreciating beauty, under the particular condition, but also has strong influence, which can cause the transfer of people's emotion and interest to attract people's attention. For example, on an international industrial product exhibition, a red food machinery produced by some country appeared in the mechanical exhibition hall. Though the red is not the color that the food machinery consistently uses, the factory surprisingly adopted red color to decorate food machinery, causing the purchaser to crowd in its vicinity and then understood its function characteristics, which produced a surprising sensation effect and made its order enormously exceeded other nation. It is thus clear that the novelty of color design is very important.

Match the new age request of appreciation beauty: With the progress of the age, the improvement of people's living standard and the increase of cultural art accomplishment, the appreciating beauty standards also change. In a certain period or a certain region or world scope, some colors are popular of people and are extensively popular, becoming the "popular color". The "popular color" has a strong age characteristic, as a result, in a period, it become the color which is used extensively. The color design of food machinery also should sufficiently consider using the "popular color" to accord with the age request.

RESULTS AND DISCUSSION

With the development of the information age as well as the massive consumptions to the earth's resources, the modeling design of food machinery more and more pursues the ecology. It is under the ecological philosophy instruction that the ecology thought is utilized, the modeling design of food machinery is integrated the "human-machine-environment" system, both considers to meet the human's need and pays great attention to the ecological environment protection (Wei, 1999).

CONCLUSION

The above is the method about humanity design of food machinery which is presented by the author, aiming at our country current development condition of food machinery, combining the industrial design principle and esthetics rule which should be followed by the modeling design of food machinery. The author makes an exploration on method of humanity design for components of food machinery, including the monitor, the console, the control device and protection device. And then the humanity design of the color of food machinery have also been pointed out, hoping that the exploration would have a help towards accelerating the development of modeling design of our food machinery and hoping that the humanity design of food machinery should cause an extensive value and a related development work also should be energetically carried out.

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