Paper B65

Development of Leathers and Leather Goods Using Deer Skins in Hyogo Prefecture

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1. Introduction

Recently the venison in Hyogo prefecture has started to be utilized, however the treatment of remaining deer skins is a problem to solve. The chamois leather is famous to use the deer skins, however the use of grain skins have been challenged in order to utilize the feature of the tanners accumulation area in Japan. Firstly white leathers tanned with formaldehyde have been developed using the optimization of formaldehyde and fatliquor and a traditional industrial art object "White Leather Goods in Himeji" has been produced with white leather. Secondly chrome tanning has introduced to the production of gloving leather using deer skins in Hyogo prefecture. The chrome tanned deer skins in Hyogo prefecture were applied to a trial product of gloves for men.

2. Materials and method

2.1 Deer skins in Japan

There are 7 kinds of deer in Japan. Among them, deer in Hyogo Prefecture are called as Honshu deer and smaller than Ezo deer in Hokkaido. In this experiment deer skins in Hyogo prefecture were used.

2.2 Formaldehyde leathers

Deer skins were tanned with 2-10 % formaldehyde and shaved 1.0 mm thickness. Formaldehyde tanned leathers were treated with 2-10 % fatliquor and dried to crust leathers. Mechanical properties were determined using the Japanese Industrial Standard (JIS) method.

2.3 Chrome leathers

Deer skins were tanned with 4, 8 and 12 % chrome tanning agent and treated with 8, 12 and 24 % fatliquor. The shaving thickness was 0.8 mm. Mechanical properties were tested and chemical analysis was done with JIS method.

3. Result and Discussion

3.1 Size of deer skins in Hyogo prefecture

Deer skins in Hyogo prefecture are very small. As the weight of 91 deer skins were measured, 70 % of raw deer skin was 2-4 kg. Less than 4 kg of raw skins dominated 80 %. The thickness of the leather obtained from 2-3 kg of raw skin weight was 0.5-0.6 mm, and that from 3-4 kg was 0.8-1.0 mm.

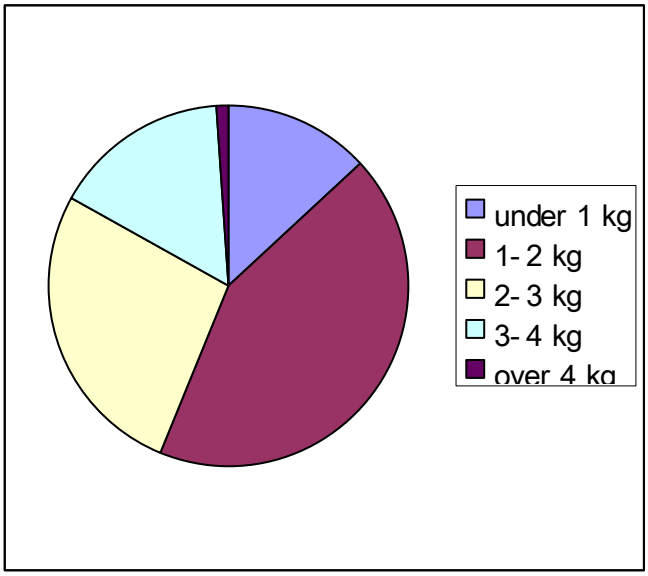

Figure 1 Ratio of the weight of deer skins in Hyogo prefecture

3.2 Formaldehyde tanned leather

Deer skins were tanned with 2-10 % formaldehyde and 2-10 % fatliquor. The influence of the doses of formaldehyde and fatliquor on the mechanical properties was examined (Table1 and 2). The most suitable mechanical properties were gained using the dose of 8 % formaldehyde and 8 % fatliquor.

Table 1. Influence of the dose of formaldehyde on the mechanical properties

Dose of formaldehyde	Tensile strength (MPa)	Elongation (%)	Tearing strength (N/mm)	Gurley Stiffness (mN)
2	24	66	65	13.6
4	35	68	69	8.0
6	27	77	64	6.9
8	23	84	56	5.3
10	23	80	45	5.2

Table 2. Influence of the dose of fatliquor on the mechanical properties

Dose of fatliquor	Tensile strength (MPa)	Elongation (%)	Tearing strength (N/mm)	Gurley Stiffness (mN)
2	17	44	35	7.3
4	19	53	53	5.9
6	26	62	63	5.9
8	23	84	56	5.3
10	29	74	68	5.1

A pair of room slippers was made with deer leathers produced using 8 % formaldehyde and 8 % fatliquor (Figure 2).

Figure 2 Trial product of room slipper using formaldehyde tanned deer leather

3.3 Chrome tanned leather

Deer skins were tanned with 4, 8 and 12 % chrome tanning agents and 8, 12 and 24 % fatliquors. The range of tensile strength of chromed tanned deer leather was 16-30 MPa. This strength was satisfied the Japanese Industrial Standard (JIS) for shoe upper bovine leather (12MPa). The tensile strength is increased with the increase of fat content in the leather.

The value of tearing strength of chrome tanned leathers were 18-37 N/mm and lower than JIS for shoe upper bovine leather (30 N/mm). Increasing the fat content in the leather, the tearing strength of deer leather became the same value of the bovine leather.

The values of softness (British Leather Center method) were 2.5-3.5 mm and increased with the fat content in the leather. These values were lower than that of imported gloving leather.

The deer leather was produced using 8 % chrome tanning agent and 12 % fatliquor, and applied to the glove. A trial product of glove was hard because of the stiffness of grain. In addition the useful area applied to the product was small in the deer skins in Hyogo prefecture, small product like as a wallet is thought to be suitable for this material.

Figure 3 Trial product of glove using chrome tanned deer leather

4. Conclusion

Deer skins in Hyogo prefecture was studied to apply to a traditional industrial art object and general purpose products.

Formaldehyde tanned deer leather was applied to a traditional industrial art object. There is almost no problem to make a slipper and book cover in the technical field.

Chrome tanned deer leather was hard for the gloves because the stiffness of the grain. The improvement of softness on the grain was needed to apply to the soft product. The chrome tanned deer leathers may be suitable for the small products like a wallet.

5. References

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