

Effects of Frequency and Processing Time on the Drying Course of Ultrasound-assisted Impregnated Wood

1. Introduction

When wood is impregnated with ultrasound assisting, the cavitation may cause pressure on the surface, promoting the modifier permeate into the wood. Wood drying is an important process during the producing course, however, there are few reports concerning the dewatering of the impregnated timber, particularly the ultrasound-assisted impregnated wood. This study focuses on the effects of frequency and processing time on the drying course of ultrasound-assisted impregnated wood, providing theoretical basis for the production practice.

2. Materials and methods

Poplar sapwood blocks with dimensions of 20×20×20mm (L×T×R) were prepared from defect free wood and with initial moisture content 150%~170%. The impregnation was carried out in ultrasonic cleaning machine with an aqueous solution of 23% low molecular weight resin.

Tab.1 Processing Condition of Every Group

	A	B	C	D	E	F
kHz	28	28	28	40	40	40
min	30	60	90	30	60	90

3. Results and discussion

Tab.2 Drying Speed at Different Period

	A	B	C
0~13h %/h	9.66	8.76	7.86
13~19h %/h	4.69	6.71	7.80
0~19h %/h	8.09	8.11	7.84
D	E	F	G
9.32	9.05	8.98	8.98
5.46	4.65	4.75	7.88
8.10	7.66	7.65	8.63

0 ~13h, the higher is the frequency the faster is the drying course while the longer is the processing time the faster is the drying speed. 13 ~19h, lower frequency generally have higher drying speed.

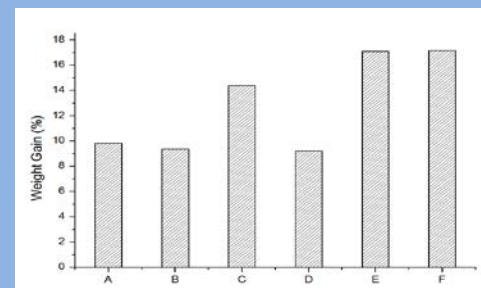


Fig.1 Weight Gain of Impregnated Groups

The similar weight gain of group A, B and D indicates the identical restraint to permeability while the different drying speed of these groups reveals the various promotion.

4. Conclusion

Ultrasonic frequency and processing time comprehensively affect the drying course of impregnated wood whose dewatering speed is slower than that of the control group throughout the whole course, especially the bound water dewatering stage.

References

HeZhengbin, GuoYuehong, etal. Preliminary study of wood ultrasound-vacuum combined drying dynamics [J].