

Research Paper :

## Thermal comfort in office work station

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### ABSTRACT

The present study was undertaken with an objectives to study the office workstation in respect of temperature and humidity and to compare the recorded temperature and humidity readings with prescribed standards. Structured schedule cum interview method was used to collect data and temperature was measured by the sling psychomotor and humidity was measured by the hygrometer. Most of the office workers were comfortably warm and warmer at office workstation than the other aspects of scale rating. The results regarding the present feelings, depicted that 43 per cent respondents felt comfortably warm, followed by (32%) being neutral, while thirty three per cent who felt much too cool and thirty six per cent mentioned that they generally were comfortably warm, during the study period except for a highly positively significant value ( $t = 4.97^{**}$ ) for the room temperature and standard during summer and it was found to be highly significant ( $r = 0.40^{**}$ ) for the expectations about thermal comfort and type of work indicating that as type of work changes the expectations regarding comfort are higher, change in workplace reflected negative significance ( $r = -0.28^*$ ) on expectations regarding thermal comfort.

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**Key words :** Temperature and humidity, Thermal comfort

A suitable physical climate is needed if one wants to feel comfortable and efficient at work. The environment feels comfortable when you are barely aware of the climatic conditions. It is only when the temperature decreases or increases beyond ones comfort limits that one becomes aware of discomfort (Jorn, 2002). The comfort zone is about 20-22°C for a comfort in the summer. An increase in temperature above the comfort level may make one tired and sleepy. A decrease in temperature may make one restless and less attentive. People vary in their feelings about what is a comfortable temperature and this depends on what they are doing and what they are wearing (Peter, 2003). Bertain *et al.* (1995) shows that age and gender can also make a difference. Old people feel more comfortable at higher temperature. Women notice that they are feeling cool quicker body size, but is also related to the difference in the how quickly women respond to changes in temperature. Women reduce the blood flow to their arms, hands and feet faster than man if they cool down. This reduction in blood flow is a way at regularly body temperature. Hence, present study was undertaken with an objective to study the office work station in respect of temperature and humidity and to compare recorded temperature and humidity readings with prescribed standards.

### METHODOLOGY

The study was conducted in Parbhani city of

Maharashtra State during the year 2008-09. For the study a sample of one hundred and twenty five subjects from the Administrative Office, Collector Office, Zilla Parishad Office, District Welfare Office and Municipal Council Office were randomly selected.

The temperature was recorded by using sling psychomotor (Dry and wet bulb thermometer) and the humidity was recorded with the help at Hygrometer. Temperature and humidity were recorded thrice in a day during working hours *i.e.* during morning 9-10 am, afternoon 12-1 pm and evening 4-5 pm. The temperature and humidity in the room were recorded and record chart for temperature and humidity for the study period were obtained from the meteorology department which were the standards for the said period. The seasonal standards for one year were used for comparison.

### FINDINGS AND DISCUSSION

The findings obtained from the present study have been discussed under following heads :

#### Perception of thermal comfort:

The results (Table 1) regarding the present feelings, depict that forty three per cent respondents felt comfortably warm, followed by 32% being neutral, while thirty three per cent who felt much too cool and thirty six per cent mentioned that they generally are comfortably warm. The feelings regarding how you would like to be

**Table 1 : Perception of thermal comfort**

Scale rating	How you feel now	General feeling at work
Much too cool	6	33
Too cool	2	12
Cool	6	10
Neutral	32	2
Comfortably warm	43	36
Too warm	10	1
Much too warm	1	6
Scale rating	How would you like to be now	How would you like to be generally at work
Warmer	44	36
No change	32	44
Cooler	24	20

now showed that forty four per cent said warmer, followed by thirty two per cent did not want any change and twenty four wanted to be cooler, whereas their feelings about, how would you like to be generally at work, 36 per cent wanted to be warmer, 44 respondents opted for no change and 20 said they would like to be cooler.

#### Comparison of humidity and temperature:

The result of Table 2 depict that there was no

**Table 2 : Comparison of humidity and temperature with standard**

Particulars	Mean $\pm$ SD	Standard	t Value
Rainy season 28 (3) June-23 Sept			
Room	80.2 $\pm$ 10.2	79.8	0.76 <sup>NS</sup>
Outside	81.8 $\pm$ 10.3		0.18 <sup>NS</sup>
Winter 1 Oct.-28 Jan.			
Room	72.5 $\pm$ 3.24	75.5	0.38 <sup>NS</sup>
Outside	74 $\pm$ 3.39		0.18 <sup>NS</sup>
Summer 29 <sup>th</sup> Feb.-27 May			
Room	31.38 $\pm$ 7.65	48.2	0.06 <sup>NS</sup>
Outside	45.8 $\pm$ 7.88		0.20 <sup>NS</sup>
Temperature ( <sup>0</sup> C)			
Rainy season 28 (3)- June 23 Sept.			
Room	31.0 $\pm$ 3.64	32.9	0.85 <sup>NS</sup>
Outside	32.6 $\pm$ 3.32		0.41 <sup>NS</sup>
Winter			
Room	29.4 $\pm$ 2.03	30.6	0.20 <sup>NS</sup>
Outside	31.3 $\pm$ 1.84		0.02 <sup>NS</sup>
Summer 29 Feb.- 27 May			
Room	35 $\pm$ 4.74	37.5	4.97 <sup>**</sup>
Outside	36.7 $\pm$ 4.61		0.09 <sup>NS</sup>

\*\* indicates significance of value at P=0.01

NS-Non significant

significant difference between prevailing standards and humidity and temperature, during the study period except for a highly positively significant value ( $t = 4.97^{**}$ ) for the room temperature and standard during summer.

#### Correlation of independent variables with thermal comfort :

The findings of Table 3 reveal that the type of work is ( $r = -0.21^*$ ) negatively significantly correlated with the present feeling implying that the thermal comfort decreased with variation in the type of work. While it is found to be highly significant ( $r = 0.40^{**}$ ) for the expectations about thermal comfort and type of work indicating that as type of work changes the expectations regarding comfort are higher. Similar trend was observed regarding occupation and feeling of thermal comfort, whereas for workplace it was noted that a change in workplace reflected negative significance ( $r = -0.28^*$ ) on expectations regarding thermal comfort. Correlation of age groups showed that as the age increased the feelings regarding thermal comfort decreased significantly, whereas in the second age group only the expected change in the thermal environment was negatively significant ( $r = -0.23^*$ ).

**Table 3 : Correlation of independent variables with thermal comfort**

Sr. No.	Particular	Present feeling	Expected change	General feeling	Expectation
1.	Type of work	-0.21*	0.01 <sup>NS</sup>	-0.09 <sup>NS</sup>	0.40 <sup>**</sup>
2.	Occupation	-0.26*	0.09 <sup>NS</sup>	-0.32 <sup>NS</sup>	0.22 <sup>**</sup>
3.	Workplace	-0.01*	0.01 <sup>NS</sup>	-0.01	0.28 <sup>**</sup>
4.	Age group				
	Group I	-0.23*	-0.28 <sup>**</sup>	-0.26 <sup>**</sup>	-0.21*
	Group II	-0.23*	-0.23*	-0.28 <sup>**</sup>	-0.20*

\* and \*\* indicate significance of values at P=0.05 and 0.01, respectively  
NS-Non significant

Therefore, it can be concluded that with the change in type of work, occupation/cadre, work place and again the feeling of thermal comfort varied from negative significance to highly positive significance.

#### Conclusion:

It was observed from study that most of the office workers were comfortably warm and warmer of office workstation than the other aspects of scale rating, humidity and temperature during the study period except for a highly positively significant value for the room temperature and standard during summer and with the change in type of work, occupation/cadre, workplace and again the

feelings of thermal comfort varied from negative significance to highly positive significance.

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