

sensitive in nature and personal. Private interviewing also was intended to help minimize work culture as a factor in the employees' responses, producing more honest responses based on the employees' feelings not the work environment.



**Figure 4: Volunteers Reading Questionnaires**

**4.4.1 Rylander (1990) Respiratory Questionnaire Response Summary:**

The workers' mean and frequency responses to the symptoms questionnaire were compiled and are shown in the questionnaire below. Some of these summarized responses were also tested using the Exact Fisher's Test for correlation with age and smoking habits.

Questions About Previous Work

1. Before this work, did you work in any other dusty environment? 88.9% Yes

Questions About Present Work (Responses)

	<b>QUESTION</b>	<b>MEAN</b>	<b>STANDARD DEVIATION</b>
3.	How many years have you worked at your present work?	4.67 Years	3.51
4.	How many hours per day do you usually work?	8.61 Hours	0.601
5.	How many days per week do you usually work?	5.83 Days	0.354
7.	How many hours have you worked today?	8.2 Hours	0.264

8. Do you ever wear breathing protection at work? 77.8% No

11. Do you often (more than a third of the time) have any of the following symptoms related to work? (Frequencies)

	YES	NO
Symptoms from chest:		
Dry Cough	<u>  4  </u>	<u>  5  </u>
Cough with Phlegm	<u>  8  </u>	<u>  1  </u>
Wheezing Chest	<u>  1  </u>	<u>  7  </u>
Chest Tightness	<u>  2  </u>	<u>  7  </u>
Dyspnea	<u>  3  </u>	<u>  5  </u>
Breathlessness	<u>  3  </u>	<u>  6  </u>
Nasal Irritation	<u>  9  </u>	<u>      </u>
Throat Irritation	<u>  2  </u>	<u>  7  </u>
Sinus Trouble	<u>  7  </u>	<u>  1  </u>
General symptoms:		
Fever	<u>      </u>	<u>  9  </u>
Headache	<u>  3  </u>	<u>  6  </u>
Vertigo	<u>      </u>	<u>  9  </u>
Nausea	<u>      </u>	<u>  9  </u>
Tiredness	<u>  8  </u>	<u>  1  </u>
Joint Pains	<u>  5  </u>	<u>  4  </u>
Skin Problems	<u>  2  </u>	<u>  7  </u>
Eye Irritation	<u>  6  </u>	<u>  3  </u>

12. Are any of the symptoms worse on a specific day of the week? 77.8% No
13. Have any of the symptoms caused sick leave? 100% No
14. Do you use any medicine regularly for any of the symptoms? 88.9% No
15. Do you have any other symptoms that you think can be related to your work?  
88.9% No
16. Do you have cough with phlegm most of the mornings? 66.7% Yes
17. How long have you had cough with phlegm? 66.7% Less than 2 Years
18. Does your chest ever feel tight in connection with work? 88.9% No
20. Have you, during the last year, had episodes of flu-like symptoms (fever, shivering, malaise, cough, tiredness, weakness, muscle and joint pains) in connection with dusty work? 88.9% No

25. Since the age of 18, have you ever had pneumonia diagnosed by a physician?  
100% No

27. Do you have any of the following conditions? (Frequencies)      Check if  
Verified by a  
Physician

	YES	NO	
Hay Fever	_____	<u>  9  </u>	_____
Eczema	_____	<u>  9  </u>	_____
Asthma	_____	<u>  9  </u>	_____
Food Allergy	_____	<u>  9  </u>	_____
Allergy to house dust	<u>  1  </u>	<u>  8  </u>	_____
Allergy to animals	_____	<u>  9  </u>	_____
Allergy to metals	_____	<u>  9  </u>	_____
Allergy to something else specify <u>  poison ivy, oak, etc.  </u>	<u>  1  </u>	<u>  7  </u>	_____

28. Please check (v) if you have had any of the following symptoms today?  
(Frequencies)

	Before Work	During Work	Does it bother you?
Dry Cough	_____	<u>  2  </u>	_____
Cough with Phlegm	<u>  3  </u>	<u>  2  </u>	<u>  1  </u>
Wheezing Chest	_____	<u>  1  </u>	_____
Chest Tightness	_____	_____	_____
Dyspnea	_____	_____	_____
Breathlessness	_____	<u>  2  </u>	<u>  1  </u>
Nasal Irritation	_____	<u>  3  </u>	<u>  1  </u>
Throat Irritation	_____	<u>  1  </u>	_____
Sinus Trouble	<u>  1  </u>	<u>  3  </u>	_____
General symptoms:			
Fever	_____	_____	_____
Headache	_____	_____	_____
Vertigo	_____	_____	_____
Nausea	_____	_____	_____
Tiredness	_____	<u>  4  </u>	_____
Joint Pains	_____	<u>  1  </u>	_____
Skin Problems	<u>  1  </u>	_____	<u>  1  </u>
Eye Irritation	_____	<u>  4  </u>	<u>  1  </u>

There are certain symptoms that the majority of the employees noted on the questionnaire and are summarized in Table 8.; however, the majority of the workers' responded that they either do not feel that the work environment is the cause of their ailments nor have they been forced to miss work due to the symptoms they experience.

**Table 8: Common Symptoms between Workers**

<b>Symptom</b>	<b>Percent of Workers</b>
Cough with Phlegm	88.9%
Nasal Irritation	100%
Sinus Trouble	87.5%
Fatigue	88.9%

It is important to note that these symptoms were experienced by most employees. When the symptoms were separated by age and smoking habits, the groups were not significantly different across the board. It tends to be that the employees all answered similarly when asked about the presence of symptoms and how the symptoms affect their daily life. Also, some fungi and bacteria are known allergens which may be at fault for these common responses among exposed workers.

#### **4.5 Pulmonary Function Tests**

The pulmonary function tests (PFTs) were administered (Figure 5) before each shift on the day that data was collected and after the shift.



**Figure 5: Worker Performing Pulmonary Function**

A general overview of the results is shown in Table 9. The headings are in reference to the workers' forced vital capacity (FVC) and forced expiratory volume in one second ( $FEV_1$ ) and how their function compared to the predicted. From Table 2 it is known that in order to have a normal PFT the resulting FVC and  $FEV_1$  must be close to the predicted; for a obstructive response the FVC value is low or normal with a low  $FEV_1$ ; and for restrictive both the FVC and  $FEV_1$  must be low for that individual.