

SPECTRAL ANALYSIS FOR FATIH SULTAN MEHMET MOSQUE



AIM OF THE STUDY

1. To determine the frequency corresponding to the first mode of the structure
2. Investigate the effect of temperature on the results obtained
3. Describe spectral analysis techniques used in civil & earthquake engineering applications
4. Discuss about the change in the level of excitation during the day in ambient vibration analysis

METHODOLOGY

1. Visual inspection of the spectrum obtained from acceleration time history
2. Determination of the governing period from displacement time history
3. Visual inspection of the spectrum obtained from displacement time history
4. Comparison of the frequencies in east-west and north-south direction using particle motion
5. Verification of the results using the earthquake record taken on 20.12.2005

RESULTS

Frequencies Corresponding to the First Mode of the Structure

	Date			
	27 Ocak (-3.2°C)		22 Mayıs (30.3°C)	
Resolution	E-W	N-S	E-W	N-S
512	2.534	2.55	2.425	2.534
1024	2.566	2.555	2.409	2.534

- The structure has an average frequency of 2.5 Hz both in east-west and north-south direction
- Temperature increase causes decrease in the frequencies
- East-west direction is susceptible to temperature changes compared north-south direction
- Earthquake record analysis verify the ambient vibration analysis results
- The level of excitation remain to be same throughout the day

