Engineering Statistics (ENGC 6310) – Dr. Samir Safi

Project I

Use Excel or SPSS to do the following project. Your report must be typed using any Microsoft editor. Write complete paragraphs and sentences describing what you see and interpreting the results. You can cut and paste only the relevant parts of the computer output to support your analysis.

Case Study #1:

A new composition for car tires has been developed and is being compared with an older composition. Ten tires are manufactured from the new composition, and ten are manufactured from the old composition. One tire of the new composition and one of the old composition are placed on the front wheels of each of ten cars. Which composition goes on the lefthand or righthand wheel is determined randomly. The wheels are properly aligned. Each car is driven 60,000 km under a variety of driving conditions. Then the wear on each tire is measured. The results are:

Car No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Wear of New Composition	2.4	1.3	4.2	3.8	2.8	4.7	3.2	4.8	3.8	2.9
Wear of Old Composition	2.7	1.9	4.3	4.2	3.0	4.8	3.8	5.3	3.7	3.1

Do the results show at the 1% level of significance that the new composition gives significantly less wear than the old composition? Interaction between the tire composition and the car can be neglected.

Case Study #2:

A water quality lab tests for the bacterial count in drinking water in a certain northern city.

a) A test is made of a claim in the literature that the time to equilibrium in bacterial growth is greater in northerly climates, the standard deviation remaining unaffected. The mean time in southerly cities has been found, from many measurements, to equal 24.1 hours with a standard deviation of 2.3 hours . The northern lab tests 21 water specimens and finds the mean time to equilibrium bacterial growth is 25.4 hours, with an estimated standard deviation of 2.2 hours, which is not significantly different from the standard deviation of 2.3 hours quoted above. Does this data bear out the claim in the literature about the increase in mean time to equilibrium, at the 5% level of significance?

b) Two salesmen turn up at the laboratory one week, each claiming that the additive he is selling will decrease the time to equilibrium bacterial growth, compared to the other salesman's product. The laboratory decides to check out the claims and tests 6 specimens of water, half of each treated with each of the two products. You should neglect any possibility of interaction. What does the following data indicate as to the salesmen's claims (at the 5% level of significance)?

	Time to Equilibrium, hours	
Water Sample no.	**Additive 1**	**Additive 2**
1	23.8	24.5
2	34.1	34.4
3	22.1	23.2
4	15.3	16.7
5	31.8	31.8
6	22.5	22.9

Good Luck