Report:

| **Parameter** | **Estimate** | **Standard Error** | **t Value** | **Pr > |t|** |
| --- | --- | --- | --- | --- |
| **TEL** | -17.3666667 | 2.80905565 | -6.18 | 0.0005 |
| **TEW** | -6.3333333 | 2.80905565 | -2.25 | 0.0588 |
| **TSL** | -10.5333333 | 2.80905565 | -3.75 | 0.0072 |
| **TSW** | 8.1333333 | 2.80905565 | 2.90 | 0.0231 |

1. **Stepdown Bonferroni (Holm, Control FWER)**

m=4, α =0.05, df(SSE) = 7

|  |  |  |
| --- | --- | --- |
| Method | Critical Value | Test |
| 1. unadjusted t | = |t7,0.025|= 2.36 | Infer  if *|* *Ti |* >  The absolute t-values for TEL, TSL, TSW > 2.36 |
| 1. 1-step Bonferroni (control FWER) | = |t7,0.05/8|= 3.33 | **Infer  if *|* *Ti |* >**  The absolute t-values for TEL and TSL > 3.33 |
| 1. **Stepdown Bonferroni (Holm, Control FWER)** | **=** 3.33  **= 3.13**  **= 2.84**  **= 2.364** | 6.18 > 3.75 > 2.9> 2.25  Step 1: 6.18 > 3.33, infer  **Goto Step 2**  Step 2: 3.75 > 3.13, Infer **Goto Step 3**  Step 3: 2.9 > 2.84, Infer  **Goto Step 4**  Step 4: 2.25< 2.364 STOP! |
| 1. **Studentized Maximum Modulus (Tukey, control FWER)** | = 3.24 | Infer  if |*Ti* |>  The absolute t-values for TEL and TSL > 3.24 |
| 1. Stepdown Studentized Maximum Modulus procedure (Shaffer – Holm, Control FWER) | = 3.24    **=3.06**    **=2.80**    **=**2.36 | 6.18 > 3.75 > 2.9> 2.25  Step 1: 6.18>3.24; infer  **Goto Step 2**  Step 2: 3.75>3.06; Infer **Goto Step 3**  Step 3: 2.9>2.80; Infer  **Goto Step 4**  Step 4: 2.25<2.36 **stop!** |

|  |
| --- |
| The SAS System |

The GLM Procedure

Dependent Variable: VOLT

| **Source** | **DF** | **Sum of Squares** | **Mean Square** | **F Value** | **Pr > F** |
| --- | --- | --- | --- | --- | --- |
| **Model** | 3 | 1436.110000 | 478.703333 | 13.39 | 0.0017 |
| **Error** | 8 | 286.040000 | 35.755000 |  |  |
| **Corrected Total** | 11 | 1722.150000 |  |  |  |

| **R-Square** | **Coeff Var** | **Root MSE** | **VOLT Mean** |
| --- | --- | --- | --- |
| 0.833905 | 19.01287 | 5.979548 | 31.45000 |

| **Source** | **DF** | **Type I SS** | **Mean Square** | **F Value** | **Pr > F** |
| --- | --- | --- | --- | --- | --- |
| **TEL** | 1 | 904.8033333 | 904.8033333 | 25.31 | 0.0010 |
| **TSL** | 1 | 332.8533333 | 332.8533333 | 9.31 | 0.0158 |
| **TSW** | 1 | 198.4533333 | 198.4533333 | 5.55 | 0.0463 |

| **Source** | **DF** | **Type III SS** | **Mean Square** | **F Value** | **Pr > F** |
| --- | --- | --- | --- | --- | --- |
| **TEL** | 1 | 904.8033333 | 904.8033333 | 25.31 | 0.0010 |
| **TSL** | 1 | 332.8533333 | 332.8533333 | 9.31 | 0.0158 |
| **TSW** | 1 | 198.4533333 | 198.4533333 | 5.55 | 0.0463 |

| **Parameter** | **Estimate** | **Standard Error** | **t Value** | **Pr > |t|** |
| --- | --- | --- | --- | --- |
| **TEL** | -17.3666667 | 3.45229392 | -5.03 | 0.0010 |
| **TSL** | -10.5333333 | 3.45229392 | -3.05 | 0.0158 |
| **TSW** | 8.1333333 | 3.45229392 | 2.36 | 0.0463 |

|  |
| --- |
| The SAS System |

The GLM Procedure

Dependent Variable: VOLT

| **Source** | **DF** | **Sum of Squares** | **Mean Square** | **F Value** | **Pr > F** |
| --- | --- | --- | --- | --- | --- |
| **Model** | 4 | 1556.443333 | 389.110833 | 16.44 | 0.0012 |
| **Error** | 7 | 165.706667 | 23.672381 |  |  |
| **Corrected Total** | 11 | 1722.150000 |  |  |  |

| **R-Square** | **Coeff Var** | **Root MSE** | **VOLT Mean** |
| --- | --- | --- | --- |
| 0.903779 | 15.47036 | 4.865427 | 31.45000 |

| **Source** | **DF** | **Type I SS** | **Mean Square** | **F Value** | **Pr > F** |
| --- | --- | --- | --- | --- | --- |
| **TEL** | 1 | 904.8033333 | 904.8033333 | 38.22 | 0.0005 |
| **TEW** | 1 | 120.3333333 | 120.3333333 | 5.08 | 0.0588 |
| **TSL** | 1 | 332.8533333 | 332.8533333 | 14.06 | 0.0072 |
| **TSW** | 1 | 198.4533333 | 198.4533333 | 8.38 | 0.0231 |

| **Source** | **DF** | **Type III SS** | **Mean Square** | **F Value** | **Pr > F** |
| --- | --- | --- | --- | --- | --- |
| **TEL** | 1 | 904.8033333 | 904.8033333 | 38.22 | 0.0005 |
| **TEW** | 1 | 120.3333333 | 120.3333333 | 5.08 | 0.0588 |
| **TSL** | 1 | 332.8533333 | 332.8533333 | 14.06 | 0.0072 |
| **TSW** | 1 | 198.4533333 | 198.4533333 | 8.38 | 0.0231 |

| **Parameter** | **Estimate** | **Standard Error** | **t Value** | **Pr > |t|** |
| --- | --- | --- | --- | --- |
| **TEL** | -17.3666667 | 2.80905565 | -6.18 | 0.0005 |
| **TEW** | -6.3333333 | 2.80905565 | -2.25 | 0.0588 |
| **TSL** | -10.5333333 | 2.80905565 | -3.75 | 0.0072 |
| **TSW** | 8.1333333 | 2.80905565 | 2.90 | 0.0231 |

| **Parameter** | **Estimate** | **Standard Error** | **t Value** | **Pr > |t|** |
| --- | --- | --- | --- | --- |
| **TEL** | -17.3666667 | 2.42685591 | -7.16 | 0.0056 |
| **TEW** | -6.3333333 | 2.42685591 | -2.61 | 0.0797 |
| **TSL** | -10.5333333 | 2.42685591 | -4.34 | 0.0226 |
| **TSW** | 8.1333333 | 2.42685591 | 3.35 | 0.0440 |
| **CLL** | -4.6333333 | 2.42685591 | -1.91 | 0.1522 |
| **CLW** | 2.4666667 | 2.42685591 | 1.02 | 0.3843 |
| **CBL** | 1.2666667 | 2.42685591 | 0.52 | 0.6378 |
| **CBW** | -2.9000000 | 2.42685591 | -1.19 | 0.3180 |

1 0 +1 +1 0 19.5  
2 +1 0 0 -1 16.4  
3 +1 0 +1 0 16.8  
4 0 -1 -1 0 35.6  
5 0 +1 -1 0 29.4  
6 -1 0 0 +1 38.5  
7 0 0 +1 -1 18.4  
8 -1 -1 0 0 38.4  
9 0 0 +1 +1 24  
10 0 +1 0 +1 27.8  
11 0 -1 0 +1 34  
12 -1 0 -1 0 44  
13 +1 0 0 +1 22.2  
14 0 0 0 0 27.2  
15 0 -1 0 -1 24  
16 +1 0 -1 0 24.8  
17 +1 -1 0 0 21.5  
18 -1 0 0 -1 29  
19 -1 0 +1 0 28.8  
20 0 +1 0 -1 19.4  
21 0 0 0 0 27.2  
22 0 -1 +1 0 24  
23 +1 +1 0 0 17.6  
24 0 0 0 0 27.2  
25 -1 +1 0 0 31.2  
26 0 0 -1 +1 36.2  
27 0 0 -1 -1 36

| **Output Statistics** | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Obs** | **TEL** | **TSL** | **TSW** | **Dependent Variable** | **Predicted Value** | **Std Error Mean Predict** | **95% CL Mean** | | **95% CL Predict** | | **Residual** |
| **1** | **1** | **1** | **1** | 18.5 | 21.5667 | 3.4523 | 13.6057 | 29.5277 | 5.6447 | 37.4887 | -3.0667 |
| **2** | **-1** | **-1** | **1** | 48.0 | 49.4667 | 3.4523 | 41.5057 | 57.4277 | 33.5447 | 65.3887 | -1.4667 |
| **3** | **-1** | **1** | **-1** | 32.0 | 30.8000 | 3.4523 | 22.8390 | 38.7610 | 14.8780 | 46.7220 | 1.2000 |
| **4** | **1** | **-1** | **1** | 36.0 | 32.1000 | 3.4523 | 24.1390 | 40.0610 | 16.1780 | 48.0220 | 3.9000 |
| **5** | **-1** | **-1** | **-1** | 32.8 | 41.3333 | 3.4523 | 33.3723 | 49.2943 | 25.4113 | 57.2553 | -8.5333 |
| **6** | **-1** | **1** | **-1** | 38.4 | 30.8000 | 3.4523 | 22.8390 | 38.7610 | 14.8780 | 46.7220 | 7.6000 |
| **7** | **-1** | **-1** | **1** | 57.8 | 49.4667 | 3.4523 | 41.5057 | 57.4277 | 33.5447 | 65.3887 | 8.3333 |
| **8** | **1** | **-1** | **-1** | 22.5 | 23.9667 | 3.4523 | 16.0057 | 31.9277 | 8.0447 | 39.8887 | -1.4667 |
| **9** | **1** | **-1** | **-1** | 23.2 | 23.9667 | 3.4523 | 16.0057 | 31.9277 | 8.0447 | 39.8887 | -0.7667 |
| **10** | **1** | **1** | **-1** | 15.4 | 13.4333 | 3.4523 | 5.4723 | 21.3943 | -2.4887 | 29.3553 | 1.9667 |
| **11** | **-1** | **1** | **1** | 31.8 | 38.9333 | 3.4523 | 30.9723 | 46.8943 | 23.0113 | 54.8553 | -7.1333 |
| **12** | **1** | **1** | **1** | 21.0 | 21.5667 | 3.4523 | 13.6057 | 29.5277 | 5.6447 | 37.4887 | -0.5667 |

| **Parameter** | **DF** | **Estimate** | **Standard Error** | **t Value** | **Pr > |t|** | **Parameter Estimate from Coded Data** |
| --- | --- | --- | --- | --- | --- | --- |
| **Intercept** | 1 | 26.581481 | 1.198567 | 22.18 | <.0001 | 26.581481 |
| **TEL** | 1 | -7.550000 | 0.804023 | -9.39 | <.0001 | -7.550000 |
| **TSL** | 1 | -6.208333 | 0.804023 | -7.72 | <.0001 | -6.208333 |
| **TSW** | 1 | 3.291667 | 0.804023 | 4.09 | 0.0008 | 3.291667 |
| **TEL\*TEL** | 1 | 0.386111 | 1.137061 | 0.34 | 0.7383 | 0.386111 |
| **TSL\*TEL** | 1 | 1.800000 | 1.392609 | 1.29 | 0.2135 | 1.800000 |
| **TSL\*TSL** | 1 | 1.423611 | 1.137061 | 1.25 | 0.2275 | 1.423611 |
| **TSW\*TEL** | 1 | -0.925000 | 1.392609 | -0.66 | 0.5155 | -0.925000 |
| **TSW\*TSL** | 1 | 1.350000 | 1.392609 | 0.97 | 0.3459 | 1.350000 |
| **TSW\*TSW** | 1 | -0.026389 | 1.137061 | -0.02 | 0.9818 | -0.026389 |