Lab Practical (Answer Sheet) - <u>Rock Support Interaction</u>

Below, enter the answers you obtain when prompted to do so during the different exercises:

Part A – Medium Support

This tutorial will analyze the ground reaction curves for a tunnel without and with support.

1. For the tunnel case given <u>without</u> support (as prompted in step 6), give the:

Plastic Zone radius (no support) = _____

Final Tunnel Convergence = _____

2. For the given amount of convergence calculated, comment on the type of support that should be considered for the tunnel (as prompted in step 6).

3. For the tunnel case given with rock bolt support added, provide the following (as prompted in step 8):

Maximum Support Pressure = _____

Maximum Average Strain = _____

4. For the tunnel case given with rock bolt support added, provide the following (as prompted in step 9):

Radius of Plastic Zone (with Support) = _____

Radius of Plastic Zone (Unsupported) = _____

% Decrease of Plastic Zone Radius by adding Support = _____

Factor of Safety = _____

Mobilized Support Pressure = _____

% of Support Capacity Used = _____

Tunnel Convergence = _____

% Decrease in Tunnel Convergence by adding Support = _____

5. For the tunnel case given with BOTH rock bolt support and shotcrete added, provide the following (as prompted in step 11):

Maximum Support Pressure = _____

Maximum Average Strain = _____

6. Complete the Table below (as prompted in step 12):

	No Support	Rockbolts	Rockbolts + Shotcrete
Factor of safety	n / a		
Mobilized support pressure (MPa)	n / a		
Plastic zone radius (m)			
Tunnel convergence (%)			

Part B – Heavy Support

This tutorial will analyze the ground reaction curves for a tunnel without and with support.

1. For the tunnel case given <u>without</u> support (as prompted in step 4), give the:

    Plastic Zone radius (no support) = _____

    Final Tunnel Convergence = _____

2. For the given amount of convergence calculated, comment on the type of support that should be considered for the tunnel (as prompted in step 4).

3. For the tunnel case given with steel set support added, provide the following (as prompted in step 6):

    Maximum Support Pressure = _____

    Maximum Average Strain = _____

4. For the tunnel case given with steel set support added, provide the following (as prompted in step 7):

    Radius of Plastic Zone (with Support) = _____

    Radius of Plastic Zone (Unsupported) = _____

    % Decrease of Plastic Zone Radius by adding Support = _____

    Factor of Safety = _____

    Mobilized Support Pressure = _____

% of Support Capacity Used = _____

Tunnel Convergence = _____

% Decrease in Tunnel Convergence by adding Support = _____

5. For the tunnel case given with BOTH steel set support and shotcrete added, provide the following (as prompted in step 8):

Maximum Support Pressure = _____

Maximum Average Strain = _____

6. Complete the Table below (as prompted in step 9):

	No Support	Steel Sets	Steel Sets + Shotcrete
Factor of safety	n / a		
Mobilized support pressure (MPa)	n / a		
Plastic zone radius (m)			
Tunnel convergence (%)			

Part C – Probabilistic Analysis

This exercise will demonstrate how to carry out a Probabilistic analysis with ROCSUPPORT.

1. For the tunnel case given with rebar support added, provide the following (as prompted in step 4):

    Maximum Support Pressure = _____

    Maximum Average Strain = _____

2. For the tunnel case given, provide the following (as prompted in step 5):

    Probability of Failure = _____

    Mean Factor of Safety = _____

    Mean Radius of Plastic Zone (with Support) = _____

    Mean Radius of Plastic Zone (Unsupported) = _____

    % Decrease of Plastic Zone Radius by adding Support = _____

    Mean Mobilized Support Pressure = _____

    % of Support Capacity Used = _____

    Mean Tunnel Convergence (with support) = _____

    Mean Tunnel Convergence (unsupported) = _____

    % Decrease in Tunnel Convergence by adding Support = _____