Lab 06 Perform straight drilling to calculate Material removal rate and machining time.

Required:

1. Plot a relationship between RPMs and Feed Rate.
2. Plot a relationship between RPMs and Material Removal Rate.
3. Plot a relationship between RPMs and Machining time.
4. Plot a relationship between RPMs and Actual Machining time.
5. Plot a relationship between machining time and actual time.

MATLAB CODE:

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% Student: (Mohammad Abubakar Atiq - F2022031002)


% Given Data

L = [23.3, 25.15, 25.15, 25.15, 25.15, 25.15]; % Depth of hole in mm

D = [2, 16, 16, 16, 16, 16]; % Diameter of drill bit in mm

RPMs = [420, 660, 660, 660, 660, 660]; % RPMs for each drilling operation

feed_rate = [43, 43, 43, 43, 43, 43]; % Feed Rate in mm/min (constant for this data)

MRR = [135, 8646, 8646, 8646, 8646, 8646]; % Material Removal Rate in mm^3/min for each operation

machining_time = [0.561162791, 0.604186047, 0.604186047, 0.604186047, 0.604186047, 0.604186047]; % Machining Time in min for each operation

actual_machining_time = [1.37, 0.67, 0.68, 0.61, 0.72, 0.77]; % Actual Machining Time in min for each operation


% Plotting Relationships


% Plot: RPMs vs Feed Rate

figure; % Create a new figure window

plot(RPMs, feed_rate, '-x', 'LineWidth', 2); % Plot RPMs against Feed Rate with '-x' markers

xlabel('RPM (rev/min)'); % Label for x-axis

ylabel('Feed Rate (mm/min)'); % Label for y-axis
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title('Lab 06: RPMs vs Feed Rate (Mohammad Abubakar Atiq - F2022031002)'); % Title of the plot

legend('Feed Rate vs RPMs'); % Legend to describe the plot

grid on; % Enable grid for better readability

% Plot: RPMs vs Material Removal Rate

figure; % Create a new figure window

plot(RPMs, MRR, '-x', 'LineWidth', 2); % Plot RPMs against Material Removal Rate with '-x' markers

xlabel('RPM (rev/min)'); % Label for x-axis

ylabel('Material Removal Rate (mm^3/min)'); % Label for y-axis

title('Lab 06: RPMs vs Material Removal Rate (Mohammad Abubakar Atiq - F2022031002)'); % Title of the plot

legend('Material Removal Rate vs RPMs'); % Legend to describe the plot

grid on; % Enable grid for better readability

% Plot: RPMs vs Machining Time

figure; % Create a new figure window

plot(RPMs, machining_time, '-x', 'LineWidth', 2); % Plot RPMs against Machining Time with '-x' markers

xlabel('RPM (rev/min)'); % Label for x-axis

ylabel('Machining Time (min)'); % Label for y-axis

title('Lab 06: RPMs vs Machining Time (Mohammad Abubakar Atiq - F2022031002)'); % Title of the plot

legend('Machining Time vs RPMs'); % Legend to describe the plot

grid on; % Enable grid for better readability

% Plot: RPMs vs Actual Machining Time

figure; % Create a new figure window

plot(RPMs, actual_machining_time, '-x', 'LineWidth', 2); % Plot RPMs against Actual Machining Time with '-x' markers

xlabel('RPM (rev/min)'); % Label for x-axis

ylabel('Actual Machining Time (min)'); % Label for y-axis

title('Lab 06: RPMs vs Actual Machining Time (Mohammad Abubakar Atiq - F2022031002)'); % Title of the plot
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legend('Actual Machining Time vs RPMs'); % Legend to describe the plot

grid on; % Enable grid for better readability


% Plot: Machining Time vs Actual Machining Time

figure; % Create a new figure window

plot(machining_time, actual_machining_time,'-x', 'LineWidth', 2); % Plot Machining Time against Actual Machining Time with '-x' markers

xlabel('Machining Time (min)'); % Label for x-axis

ylabel('Actual Machining Time (min)'); % Label for y-axis

title('Lab 06: Machining Time vs Actual Machining Time (Mohammad Abubakar Atiq - F2022031002)'); % Title of the plot

legend('Actual Time vs Machining Time'); % Legend to describe the plot

grid on; % Enable grid for better readability
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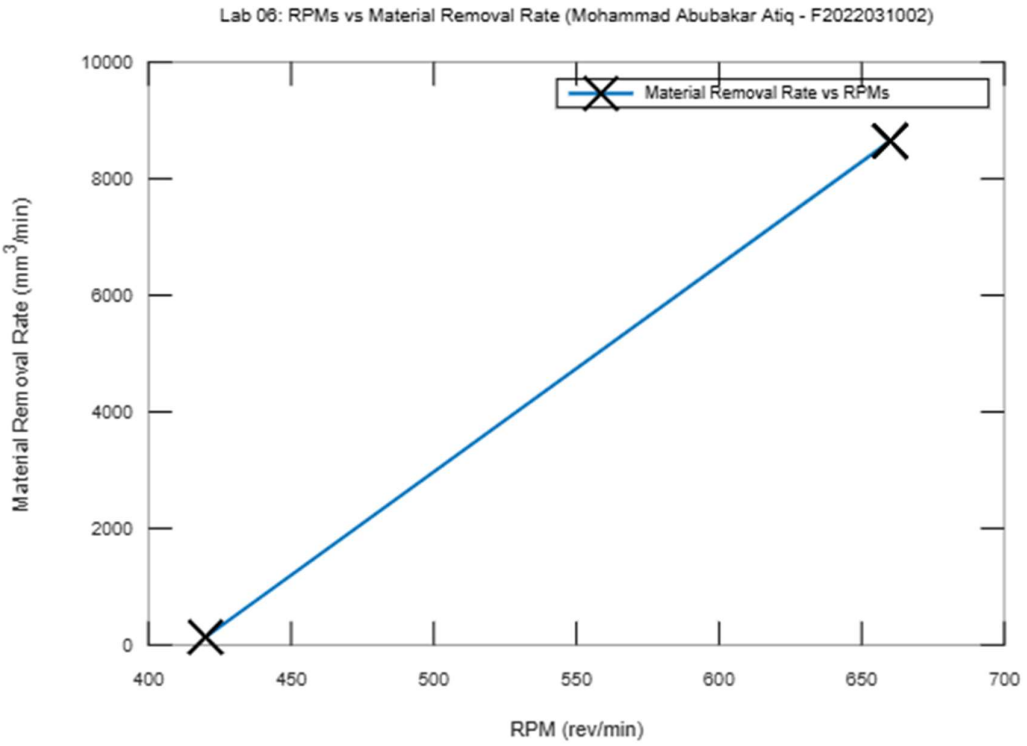
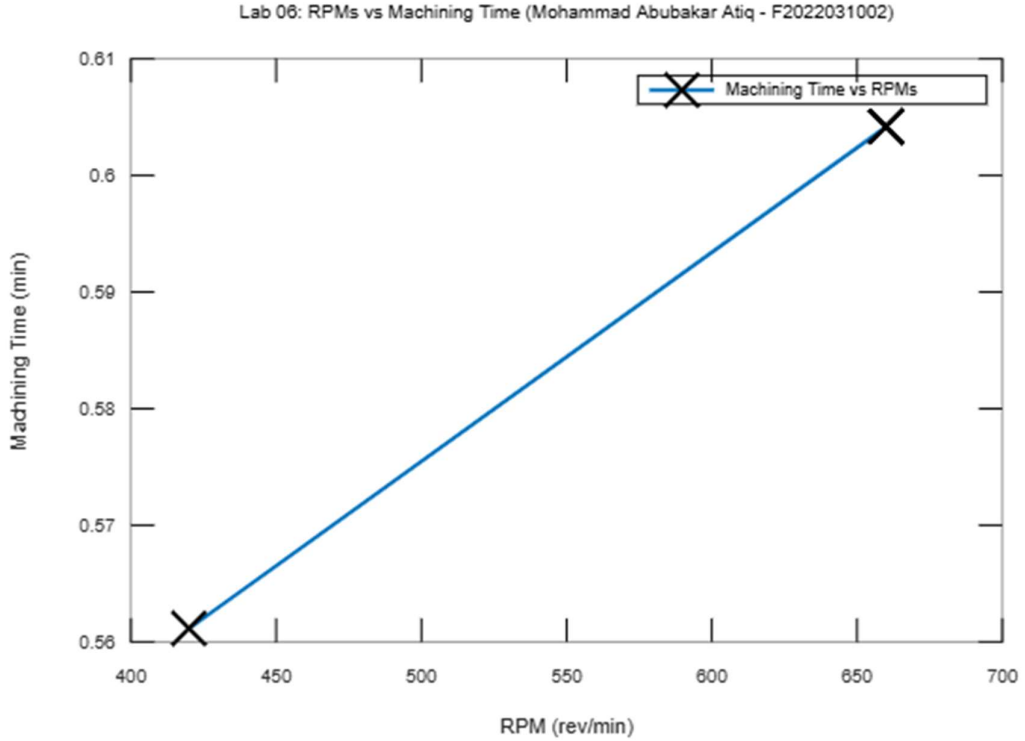
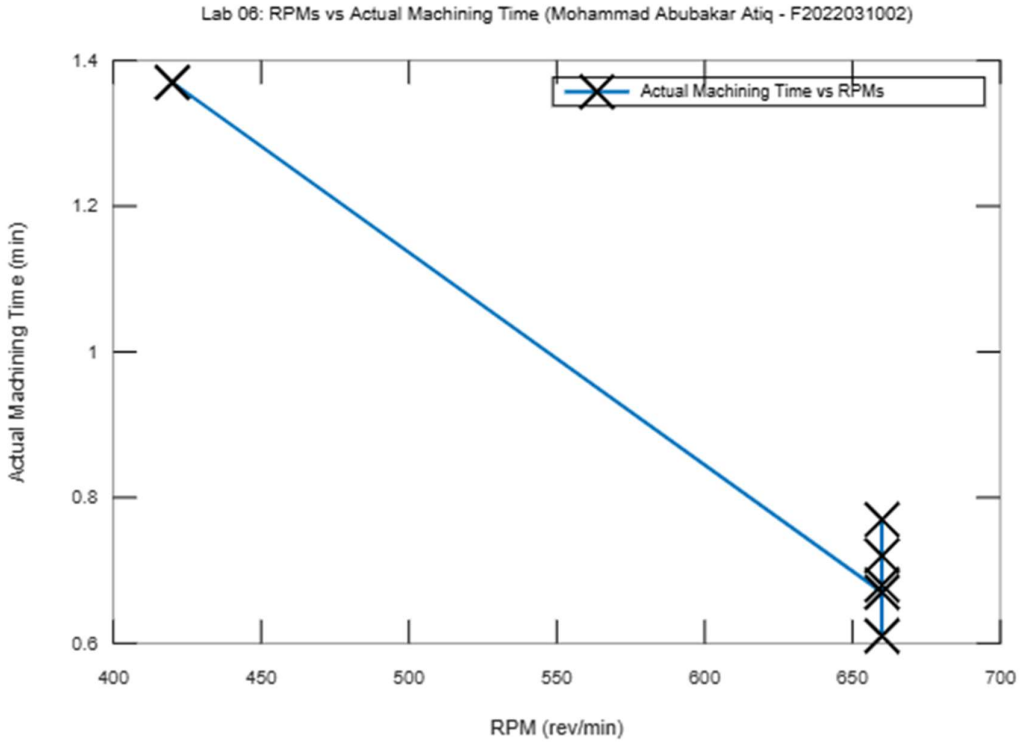
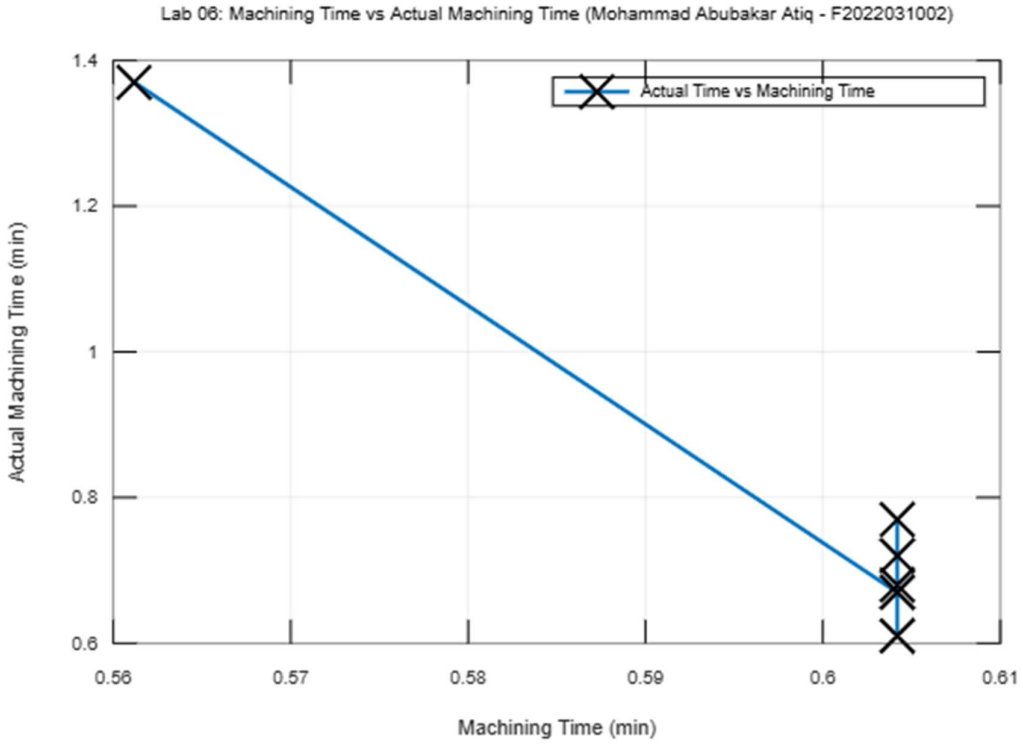
Graphs


Lab 06: RPMs vs Material Removal Rate (Mohammad Abubakar Atiq - F2022031002)
Material Removal Rate vs RPMs
Material Removal Rate (mm3/min)
10000
8000
6000
4000
2000
0
400
450
500
550
600
650
700
RPM (rev/min)


Lab 06: RPMs vs Machining Time (Mohammad Abubakar Atiq - F2022031002)
Machining Time vs RPMs
Machining Time (min)
0.61
0.6
0.59
0.58
0.57
0.56
400
450
500
550
600
650
700
RPM (rev/min)


Lab 06: RPMs vs Actual Machining Time (Mohammad Abubakar Atiq - F2022031002)
Actual Machining Time vs RPMs
Actual Machining Time (min)
1.4
1.2
1
0.8
0.6
400
450
500
550
600
650
700
RPM (rev/min)


Lab 06: Machining Time vs Actual Machining Time (Mohammad Abubakar Atiq - F2022031002)
Actual Time vs Machining Time
Actual Machining Time (min)
1.4
1.2
1
0.8
0.6
0.56
0.57
0.58
0.59
0.6
0.61
Machining Time (min)

Comments:

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