

## Table of Content

|                   |       |     |
|-------------------|-------|-----|
| List of Figure    | ..... | I   |
|                   | ..... |     |
| List of Table     | ..... | II  |
|                   | ..... |     |
| Abstract          | ..... | III |
| (English)         | ..... |     |
| Abstract (Arabic) | ..... | IV  |
|                   | ..... |     |

### ***Chapter One: Introduction and Literature Review***

|                                  |       |   |
|----------------------------------|-------|---|
| 1-1-1 Mohr Coulomb Failure       | ..... | 7 |
| Criterion model                  |       |   |
| 1-1-2 Hoek Brown Criterion model |       | 8 |
|                                  | ..... |   |
| 1-1-3 Drucker Prager Criterion   |       | 8 |
| model.....                       | ..... |   |

### ***Chapter Two: Tectonic and sedimentology***

|                   |       |   |
|-------------------|-------|---|
| Muglad            |       | 1 |
| Basin.....        | ..... | 5 |
|                   | ..... |   |
| 2-1-1: Regional   |       | 1 |
| geology.....      | ..... | 5 |
| ..                |       |   |
| 2-2: Basin        |       | 1 |
| Stratigraphy..... | ..... | 5 |
|                   | ..... |   |
| 2-4: Well         |       | 2 |
| profile.....      | ..... | 0 |
|                   | ..... |   |

### ***Chapter Three: Data Acquisition and Analysis***

|                 |       |   |
|-----------------|-------|---|
|                 |       | 2 |
|                 |       | 1 |
| 3-1: Drilling   |       | 2 |
| Parameters..... | ..... |   |

|   |   |
|---|---|
| .....   | 2 |
| 3-2: wire line log.....                               | 4 |
| .....   |   |
| 3-3: Hydraulic Parameter.....                         | 6 |
| .....   |   |
| 3-4: Graphical Correlation .                          |   |
| 3-4-1: Hydraulic Parameter Graphical Correlation..... | 9 |
| 3-4-2 : Wire line Log Graphical Correlation.....      | 1 |
| 3-4-3: Drilling Parameter Graphical Correlati.....    | 3 |
| 3-4-4: Result and Discussion.....                     | 4 |

***Chapter Four : Investigation of drilling operation limitation and equipment selection***

|                            |   |
|----------------------------|---|
| 4-1-1 NEEM-F.....          | 7 |
| .....                      |   |
| 4-1-2: NEEM-6.....         | 7 |
| .....                      |   |
| 4-1-3: NEEM-10.....        | 8 |
| .....                      |   |
| 4-1-4: NEEM-12.....        | 8 |
| .....                      |   |
| 4-2: Mohr Calculation..... | 3 |

|                                    |   |
|------------------------------------|---|
| .....                              | 8 |
| 4-3 : Drucker Prager Failure Model | 4 |
| .....                              | 1 |

***Chapter Five :Conclusion and Recommendation***

|                     |   |
|---------------------|---|
| 5-1                 | 5 |
| Conclusion.....     | 3 |
| .....               |   |
| 5-2                 | 5 |
| Recommendation..... | 3 |
| .....               |   |
| References.....     | 5 |
| .....               | 4 |



## List of Figure

| <b>Figure</b> | <b>Name</b>   | <b>Page</b> |
|---------------|---|-------------|
| <b>1-1</b>    | Relationship between stress and strain  | 1           |
| <b>1-2</b>    | Effect of compaction on strength properties   | 2           |
| <b>1-3</b>    | stress state for passive/ active region   | 5           |
| <b>1-4</b>    | Shear failure models  | 6           |
| <b>1-5</b>    | Tensile failure models  | 6           |
| <b>1-6</b>    | Mohr envelope   | 8           |
| <b>1-7</b>    | Drucker Prager failure criterion  | 10          |
| <b>2-1</b>    | Generalized Stratigraphic Column For Muglad Basin                                   | 18          |
| <b>2-2</b>    | The structure Map Of NEEM Field   | 19          |
| <b>2-3</b>    | Well profile of NEEM F2, NEEM6, NEEM10, NEEM12                                      | 20          |
| <b>3-1</b>    | Neem 6,10,12,F2Depth vs Yield point   | 29          |
| <b>3-2</b>    | Neem 6,10,12,F2 Depth vs Density  | 29          |
| <b>3-3</b>    | Neem 6,10,12,F2 Depth vs Plastic Viscosity  | 30          |
| <b>3-4</b>    | Neem 6, NEEM 10, NEEM 12, NEEM F2 Depth vs GR                                       | 31          |
| <b>3-5</b>    | Neem 6,10,12,F2 Depth vs Caliper  | 31          |
| <b>3-6</b>    | Neem 6,10,12,F2 Depth vs SP   | 32          |
| <b>3-7</b>    | Neem 6,10,12,F2 Depth vs WOB  | 33          |
| <b>3-8</b>    | Neem 6,10,12,F2 Depth vs ROP  | 33          |
| <b>4-1</b>    | The Mohr Envelope in Neem 6   | 39          |
| <b>4-2</b>    | The Mohr Envelope in Neem 10  | 39          |
| <b>4-3</b>    | The Mohr Envelope in Neem 12  | 40          |
| <b>4-4</b>    | The Mohr Envelope in NeemF <sub>2</sub>   | 40          |
| <b>4-5</b>    | NEEM6 Ducker Prager Failure Criteria model  | 41          |
| <b>4-6</b>    | NEEM10 Ducker Prager Failure Criteria model   | 42          |
| <b>4-7</b>    | NEEM12 Ducker Prager Failure Criteria   | 43          |
| <b>4-8</b>    | NEEMF2 Ducker Prager Failure Criteria   | 44          |
| <b>4-9</b>    | Casing seat Selection In NEEM6 NEEM10, NEEM12 , NEEM F <sub>2</sub>                 | 47          |
| <b>4-12</b>   | NEEM 6, NEEM10, NEEM12, NEEM F <sub>2</sub> Relation ship between SE With Cum Depth | 50          |

## LIST OF TABLE

| <b>Table</b> | <b>Name</b>   | <b>page</b> |
|--------------|---|-------------|
| 2-1          | Contained lithology And Environment of Muglad Basin | 16          |
| 3-1          | Data Obtain For Daily Drilling Report               | 22          |
| 3-2          | Data Obtain For LAS File                            | 24          |

|     |   |    |
|-----|---|----|
| 3-3 | Data Obtain From Daily Mud Report                                       | 26 |
| 4-1 | Result Of Failure Envelope( $\sigma_1, \sigma_3$ )                      | 36 |
| 4-2 | Result Of Calculation ( $\sigma_{\theta\theta} \sigma_{rr}$ )           | 36 |
| 4-3 | Result Of Calculation Tensile Strength Mud Weight Mud Pressure          | 37 |
| 4-4 | General Result Of Calculation In NEEM F <sub>2</sub>                    | 37 |
| 4-5 | General Result Of Calculation In NEEM 6                                 | 37 |
| 4-6 | General Result Of Calculation In NEEM 10                                | 38 |
| 4-7 | General Result Of Calculation In NEEM12                                 | 38 |
| 4-8 | Formation Pressure And Fracture Gradient In NEEM 6,10,12,F <sub>2</sub> | 45 |

## **Abstrac**

Introducing the stresses concentration and the instability phenomena that could exceed the formation strength causing hole failure. The study starts by collecting data and evaluating the daily field information in contingency with other running operations.

The failure envelope stress, mud pressure and mud weight calculation were done Using Mohr and Ducker Prager Failure Criteria model to prevent hole collapse in Neem field. The proposed parameters and stress distribution treated as a base for investigating the drilling limitations: how to overcome fracturing, sticking, etc.; getting the optimum mud to be used in the NEEM field.

Meanwhile investigating the casing seat points and using for the better bit selection. This will optimize the cost benefits and the whole operation economical risk in NEEM field.

## مستخلص

ان ظاهرة تركيز الاجهادات حول حفرة البئر تؤدي الي عدم استقرارية الجدران مما يؤدي الى حدوث الانهيار . انهيار جدران البئر مرتبط ارتباط وثيق بالمقاومة وضغط الموائع الموجودة داخل المسامات .

بدأت الدراسة بجمع المعلومات وتقييمها وتحليلها من خلال المعلومات اليومية لعمليات الحفر وعمليات التشغيل الاخرى .

فى هذه الدراسة اجريت عمليات حسابية لضغوط ووزن سائل الحفر من خلال معلومات الحفر وسائل الحفر بالاضافة الي معلومات تسجيلات الابار باستخدام نموذج موهر والنموذج المطور له لتجنب انهيار جدران البئر في حقل نيم .

يتم الحصول علي امثل سائل حفر مستخدم في حقل نيم ومن ثم يتم التغلب علي التشقق والاستعصاء.. الخ. وعليه لا بد من التعامل مع الاجهادات حول البئر وعلاجها كاساس لمحددات عملية الحفر حينئذ يمكن تقدير مواقع الحدوة الدليلية لانابيب البطانة وتحديد امثل سكةينة لعملية الحفر الامر الذي يحسن من الفائدة ويقلل من المخاطر الاقتصادية.