

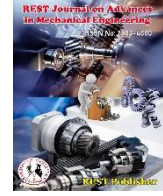


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Automatic interpretation of structural plane parameters in borehole camera images from drilling engineering using MOORA method

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Abstract: Drilling engineers in general Extraction and production of oil and gas Used by multinational corporations. Existing Safety measures for evaluation and maintenance of wells Design elements to ensure implementation and they are also responsible for estimating the cost of machinery and construction. The main educational qualification for them is Bachelor's degree in Geology or Mechanical but sometimes equivalent credits are given in Petroleum Engineering. Drilling engineers must have excellent knowledge of physics, geology, chemistry and mathematics, as well as strong IT skills. Alternative: Nenjiang Formation, Yaojia Formation, Denglouku Formation, and Yingcheng Formation. Evaluation Preference: Mudstone, Oil shale, Pelitic siltstone, Coal seam, Insect layer. From the result it is seen that Insect layer and is got the first rank whereas is the Coal seam got is having the lowest rank. The value of the dataset for Drilling engineers in GRA (Gray-related analysis) shows that it results in Insect layer and top ranking.

Key Words: *Mudstone, Yaojia Formation, Coal seam, Insect layer.*

1. Introduction

Drilling technology is Technology for drilling purposes is to use. This type refers to drilling into rock or soil. Drilling is the process of drilling a hole For oil and natural gas production A drill bit to make a well Using with different functions There are different types of oil wells: Study for research purposes in this areas Wells are drilled. Drilling is labor intensive and physically demanding work. But for many FIFO drillers out there, drilling is the perfect job, especially for those looking to save a nest egg and enter the property market. Strong communication and interpersonal skills as you work with a wide variety of people. Numerical and IT skills. Analytical skills to reframe problems and develop solutions. Ability to work under pressure. Employment of drilling engineers is expected to grow at an average rate over the next decade. The demand for drilling engineers depends on the demand for Oil and natural gas. Price these commodities increases, more wells will be drilled, resulting in a greater demand for drilling engineers. 2.2 Ratio Analysis (Moora) Optimization Multi-objective based on Optimization, multi-criteria or multi- Also known as Tribute Optimization Called, it is for two or more It is the process of simultaneously improving multiple conflicting traits. Some restrictions. Drilling is a cut process, which in solid materials A to cut a hole of circular cross section Uses a drill bit. A The drill bit is usually rotary cutting Instrumental, often with multiple points. Bit per minute pressed against the work piece rotates hundreds to thousands of revolutions.

2. Drilling Engineering

Narrative Drilling Engineering Drilling Engineering CPR is used for complications a is the domain of application, in which formal storage and by the circumstance of past solid experiences Induced reuse can be drilled at various levels Significant support for employees provides [1] The properties and mechanisms of modification of various nano materials are revealed, which can be used in different segments of the petroleum industry, such as exploration, reservoir engineering, and enhanced oil recovery, drilling technology and refining processes. [2] If Bionic technology, specifically bionic Non-smooth theory, drilling in Engineering Technology Innovative for the development of technology introduced, it bores Creates thought. [3] An overview of this behavior That is, installation may be delayed and Used WOB by rebuilding can be changed to a higher value of Penetration Also the rate depends on the total amount It is important to highlight that where ROP Contrast that with drill-bit sizes has a proportional relationship. [4] An IDIS is a system designed to record while drilling and is connected to a rotary drilling system with an intelligent system at the surface and operated using drilling-analysis software.[5]

Annular flow measuring principle, weight function, Annual Flow for Drilling Engineering Virtualization of electromagnetic measurement system Current density and magnetic field are described and analyzed were made. [6] For drilling engineering, structural plane Borehole camera to obtain parameters Mostly image post-processing A fast and effective method, it is great. [7] As a soil system with advanced technology, Coal field, geological engineering, metallurgy and Through metallization and fine hole drilling Poly acryl amide non-dispersive perforating soil less The solid phase is followed continuously. non-ferrous. [8] Drilling and well-served users Current engineering in their applications Reflecting the practice, their personal On the latest version of the computer's operating system And that exudes authenticity are expecting equipment. [9] The nature of a subsea development is pipeline, Other of Operations and Facilities Engineering Covers fields implicitly. These impose mandatory requirements to be considered in well drilling engineering. [10] Continental Science Drilling Engineering, which acts like a telescope to help humans look deeper into the Earth, is an epoch-making discovery in the contemporary field of Earth science, and drives the current. [11] In principle, of waste management technology Application is solution to environmental problem approach, and from a process Waste is generated. So, drilling Waste generation mechanisms in engineering Control requires a preventative approach. [12] There are some studies on engineering drilling in plastics But for polymers, burr formation is efficient Not used. On the formation of bur Most of the studies involved metals or alloys [13] Drilling planning and real-time Integrated drilling for optimization Engineering Software Drilling Design, To meet the needs of analysis [14]. A large Perfect for drilling engineering applications In selecting an annulus flow meter Blow Technology that offers options There is an array of options. of down hole drilling A wide range related to the special environment Factors such as down hole spacing, velocity profile and such as temperature and fluid properties should be considered. [15] The application of drilling engineering concepts has produced Various planets like Moon and Mars Reflect the drilling process to environments A robust drilling system with capacity. [16] A thorough autopsy of the case was performed using a private third-party approach. Based on an advanced drilling engineering method, to determine the root causes of the incident [17] Pre-job engineering, also inside the hole Invisible when out and about Rig's overall by eliminating time and ways to improve performance considers [18] As data volume increases, remote engineers Their analysis has a huge impact Focus on tools that can also drive efficiency to be paid. Real-time hydraulics and torque and tools such as drag (T&D) analysis and by using engineering models, Engineers work on the position of a well can be determined before half. [19] The Design Science and Engineering of RCS It started with the development of requirements system. The American I scoring Scientific Society developed scientific requirements that include core quality, desired core length, number of deflections per core at a specified depth. [20] Although applications are available on the mainframe, Direct links to engineering applications Not provided. Both systems have met the reporting requirements, but Does not support planning or rig site operations. [21] For business units involving four events were classified as highly probable, and Total cost of adjustment and loss of revenue Exceeds \$50 million. So many expenses Although The software, or its use, cannot be attributed to the authors [24] The specific objectives of this review are, firstly, to Among the active fields of drilling engineering Reviewing the state of the art in and Current pressing technical issues Researching. great demand. [25].

3. Moora

Instantly helps to choose the best option. Hence, multi-objective optimization techniques based on the options available One or more from the set To rank or select alternatives Seems like a suitable tool. MOORA method, first introduced by Brauers. [1] Multi-objective optimization based on Ratio analysis (MOORA) method, available to either or from a set of options sorting out more alternatives or choosing between beneficial and ineffective Considers objectives. [2] So the improved Nominal group technique but also Delphi technique Bring support. In addition, MOORA multi- The seventh condition of objective optimization is 2 partly using different methods Satisfies. [3] The computation the time of MOORA method is obviously less has similarly, work for other MODM methods Requires separate software to do, however MOORA method can work even in MS Excel. [4] Multi-Objective by Ratio Analysis Method (MOORA). Optimization satisfies the first six conditions. In addition, MOORA multi-objective optimization two different methods of the seventh condition It is somewhat satisfying to use. [5] It has also been demonstrated that the Multi-Objective by Ratio Analysis Method (MOORA). Optimization satisfies the first six conditions. In addition, MOORA multi-objective optimization two different methods of the seventh condition It is somewhat satisfying to use. [6] Industrial Engineers and Prospective about Industrial Engineers For data obtained from questionnaires Fuzzy AHP and Fuzzy MOORA methods have been used. [7] Of criteria in MOORA risk prioritization to their respective risks, considering the weights this method is used to distinguish between assigned priorities was used. function.[8] MOORA based multi-objective ratio analysis There are also upgrades. Easy to use methods for preparing the best rankings for choosing sales locations. [9] Integration method MOORA and Taguchi methods are addressed For the first time in this paper to determine the optimal factor size. [10] The MOORA system is Scholarship to improve academic achievement Decision support for selecting recipients system. Various problems can be overcome in facilitating decision making using

the MOORA method. [11] A novel MOORA and MOOSRA method Trusted production of quality and quantity to deal with the process selection problem proposed. characteristics. [12] Ratio analysis (MOORA) based multi-Objective optimization multi-criteria or also called multi-attribute optimization. Two or more conflicting characteristics It is a simultaneous process of improvement is defined restrictions. [13] From this point MOORA applied the approach to Better from the customer's point of view Final ranking of maintenance contractors contractors' point of view. [14] The present objective is to develop and recommend an evaluation and selection method based on ratio analysis (MOORA) as an alternative approach method by using multi-objective optimization. [15] Larger matrices required more guarantees. In 2010, a new approach was developed under the name Multi Mura, by adding the last possible dimensionless method, i.e. the fully multiplicative form of multiple objectives. [16] MOORA is a multi-criteria optimization method first weighed by Brauers and Zavadskas Used for lack of method. its potential to provide on-psychotics. [17] Used the MOORA method to solve a multi-criteria Optimization problem in milling process. Different Suitable grinding in grinding processes six including selection of process parameters Decision problems are considered. [18] Proposed a A two-stage approach: First Supplier evaluation at stage used implicitly. MULTIMOORA with triangular fuzzy numbers. [19] An FMEA-Based Pythagorean Fuzzy AHP- In the MOORA integrative approach literature Assess various occupational hazards from proposed. A key difference is in approach to ensure accurate risk assessment. [20]

4. Analysis And Discussion

TABLE 1. Drilling Engineering

	DATA SET			
	Nenjiang Formation	Yaojia Formation	Denglouku Formation	Yingcheng Formation
Mudstone	72.08	536.53	19.15	41.05
Oil shale	68.12	637.97	27.69	29.30
Pelitic siltstone	81.08	372.58	37.18	20.10
Coal seam	42.17	491.28	43.60	12.59
Insect layer	52.33	753.41	26.96	11.89

Table 1. Shows the Nenjiang Formation it is seen that Pelitic siltstone is showing the highest value for Coal seam is showing the lowest value. Yaojia Formation it is seen that Insect layer is showing the highest value for Pelitic siltstone is showing the lowest value. Denglouku Formation it is seen that Coal seam is showing the highest value for Mudstone is showing the lowest value. Yingcheng Formation it is seen that Mudstone is showing the highest value for Insect layer is showing the lowest value. Table 1 shows the Drilling Engineering for Alternative: Nenjiang Formation, Yaojia Formation, Denglouku Formation, and Yingcheng Formation. Evaluation Preference: Mudstone, Oil shale, Pelitic siltstone, Coal seam, Insect layer.

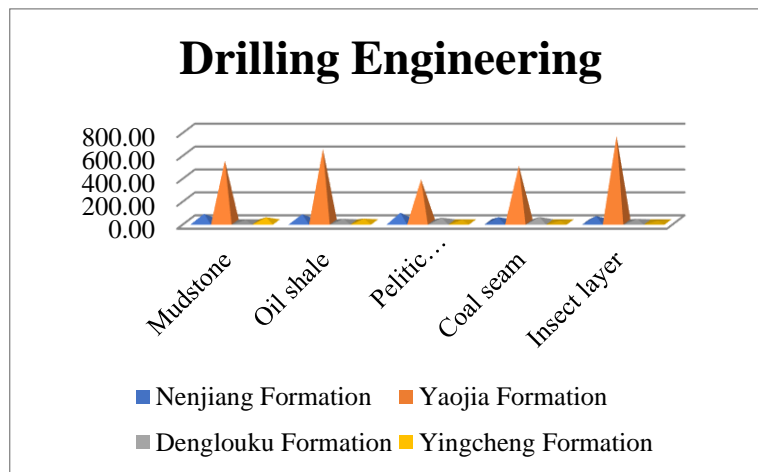


Figure 1 shows the Drilling Engineering for Alternative: Nenjiang Formation, Yaojia Formation, Denglouku Formation, and Yingcheng Formation. Evaluation Preference: Mudstone, Oil shale, Pelitic siltstone, Coal seam, Insect layer.

TABLE 2. Divide & Sum

Mudstone	5196	287864	366.72	1685.103
Oil shale	4640	407006	766.74	858.49
Pelitic siltstone	6574	138816	1382.4	404.01
Coal seam	1778	241356	1901	158.5081

Insect layer	2738	567627	726.84	141.3721
	20927	1642669	5143.6	3247.483

Table 2 shows the Divide & Sum matrix formula used this table.

TABLE 3. Normalized Data

Normalized Data			
Nenjiang Formation	Yaojia Formation	Denglouku Formation	Yingcheng Formation
0.4982712	0.418619083	0.267014	0.720344
0.4708967	0.497766045	0.38609	0.514155
0.560486	0.290699677	0.518412	0.352714
0.2915108	0.383313483	0.607928	0.220929
0.3617444	0.587836287	0.375912	0.208645

$$X_{n1} = \frac{x_1}{\sqrt{(x_1)^2+(x_2)^2+(x_3)^2\dots}} \quad (1).$$

Table 3 shows the various Normalized Data Nenjiang Formation, Yaojia Formation, Denglouku Formation, and Yingcheng Formation. Normalized value is obtained by using the formula (1).

TABLE 4. Weight

Weight			
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25

$$X_{wnormal1} = X_{n1} \times w_1(2).$$

Table 4 shows the Weight ages used for the analysis. We had taken same weights for all the parameters for the analysis. All weight value same 0.25.

TABLE 5. Weighted normalized decision matrix

Weighted normalized decision matrix			
0.1	0.1	0.1	0.180086
0.1	0.1	0.1	0.128539
0.1	0.1	0.1	0.088178
0.1	0.1	0.2	0.055232
0.1	0.1	0.1	0.052161

Table 5 shows the weighted normalized decision matrix Nenjiang Formation, Yaojia Formation, Denglouku Formation, and Yingcheng Formation. the weighted default result is calculated using the matrix formula (2).

TABLE 6. Assessment value

	Assesment value
Mudstone	-0.018
Oil shale	0.017
Pelitic siltstone	-0.005
Coal seam	-0.039
Insect layer	0.091

Table 6 shows the Assessment value& Rank value used. Assessment value for Mudstone = -0.018, Oil shale = 0.017, Pelitic siltstone = -0.005, Coal seam = -0.039, Insect layer = 0.091.

$$Assesmentvalue = \sum X_{wn1} + X_{wn2} - X_{wn3} \quad (3).$$

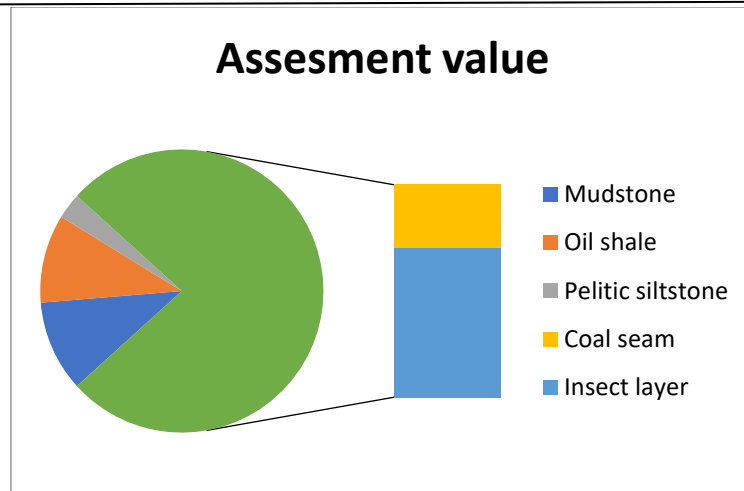


FIGURE 2. Assesment value

Figure 2 graphical view of MOORA method using the analysis Assesment value Insect layer sourced energy is showing the highest value for Coal seam is showing the lowest value.

TABLE 7. Rank

	Rank
Mudstone	4
Oil shale	2
Pelitic siltstone	3
Coal seam	5
Insect layer	1

Table 7 shows the graphical view of the Mudstone is in 4th h rank, the Oil shale is in 2nd, the Pelitic siltstone 3rd, Coal seam is in 5th rank, the Insect layer is in 1st rank

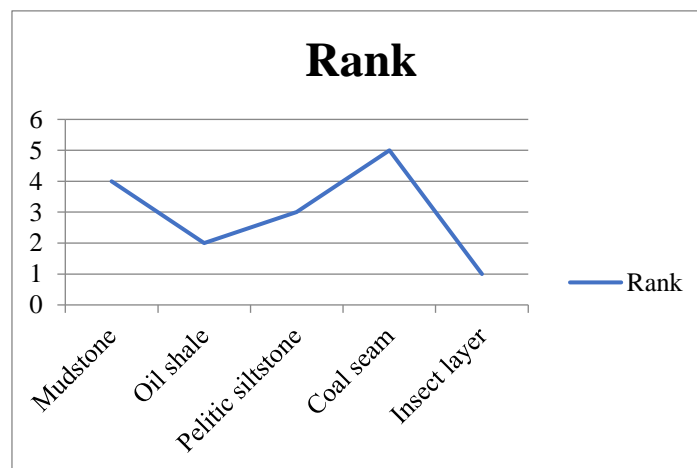


FIGURE 3. Rank

figure 3 shows the graphical view of the Mudstone is in 4th h rank, the Oil shale is in 2nd, the Pelitic siltstone 3rd, Coal seam is in 5th rank, the Insect layer is in 1st rank

5. Conclusion

Continental Science Drilling Engineering, which acts like a telescope to help humans look deeper into the Earth, is an epoch-making discovery in the contemporary field of Earth science, and drives the current. In principle, of waste management technology Application is solution to environmental problem approach and from a process Waste is generated. So, drilling Waste generation mechanisms in engineering Control requires a preventative approach. The application of drilling engineering concepts has produced various planets like Moon and Mars Reflect the drilling process to environments a robust drilling system with capacity. A thorough autopsy of the case

was performed using a private third-party approach. Based on an advanced drilling engineering method, to determine the root causes of the incident. From this point MOORA applied the approach to Better from the customer's point of view Final ranking of maintenance contractors contractors' point of view. The present objective is to develop and recommend an evaluation and selection method based on ratio analysis (MOORA) as an alternative approach method by using multi-objective optimization. An IDIS is a system designed to record while drilling and is connected to a rotary drilling system with an intelligent system at the surface and operated using drilling-analysis software. Annular flow measuring principle, weight function, Annual Flow for Drilling Engineering Virtualization of electromagnetic measurement system Current density and magnetic field are described and analyzed were made. From the result it is seen that Insect layer and is got the first rank whereas is the Coal seam got is having the lowest rank.

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