

1. Structure of iFIX's block chain and its application

Wang, Yue-Long

Source: *Huagong Zidonghua Ji Yibiao/Control and Instruments in Chemical Industry*, v 31, n 5, p 34-37, October 2004;

Language: Chinese; **ISSN:** 10003932; **Publisher:** Institute of Automation of Ministry of Chemical Engineering

Author affiliation: (1) Electronic Engineering College, Xi'an Shiyou University, Xi'an 710065, China

Abstract: The structure of iFIX's block chain and the program's scheduler of its block's processing are analysed. Some configuration problems in flow compensation, flow cumulation and PID control loop are discussed. A user program is written for the digital PID and its manual/automated change. More block chains are used for the block's calculation and control loop.

Database: Compendex

Data Provider: Engineering Village

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2. Experimental study of large range enhanced temperature sensitivity concerning fiber Bragg grating temperature sensor

Sun, An (1); Qiao, Xueguang (1); Jia, Zhen'an (1); Guo, Tuan (1); Chen, Changyong (1)

Source: *Guangxue Xuebao/Acta Optica Sinica*, v 24, n 11, p 1491-1493, November 2004; **Language:** Chinese; **ISSN:** 02532239; **Publisher:** Chinese Optical Society

Author affiliation: (1) Optical Fiber Sensing Lab., Xi'an Shiyou Univ., Xi'an 710065, China

Abstract: The temperature response and sensitivity enhancing technology concerning fiber Bragg grating (FBG) is analyzed. A special kind of heat-resistant polymer is used to coat FBG to enhance the temperature sensitivity of FBG sensor. The polymer coating and solidifying process of FBG is improved. A kind of heat-conducted adhesive is used to reduce the friction between tube and polymer, and eliminate the chirp effect of FBG caused by the asymmetric shrinkage of polymer during the package process. The experimental results show that the FBG sensor can measure temperature from 20°C to 180°C. The temperature response sensitivity is 0.05 nm/°C from 20°C to 130°C and 0.22 nm/°C from 130°C to 180°C, respectively, and the response trend line has good linearity in both areas. This kind of sensor is easy to fabricate and can be used for high temperature measurement. (6 refs)

Main heading: Fiber Bragg gratings

Controlled terms: Fiber optic sensors - Heat resistance - Sensitivity analysis - Temperature measurement

Uncontrolled terms: Enhanced temperature sensitivity - Temperature sensor

Classification Code: 741.1.2 Fiber Optics - 741.3 Optical Devices and Systems - 921 Mathematics - 944.6 Temperature Measurements

Treatment: Applications (APP) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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3. Optimum drilling program for complex well under complex geological condition

Li, Qi ; He, Hua-Can ; Zhang, Shao-Huai

Source: *Shiyou Xuebao/Acta Petrolei Sinica*, v 25, n 4, p 80-83, July 2004; **Language:** Chinese; **ISSN:** 02532697;

Publisher: Science Press

Author affiliation: (1) Northwestern Polytechnical Univ., Xi'an 710072, China (2) Xi'an Shiyou Univ., Xi'an 710065, China

Abstract: There are many uncertainties and complex problems in the fields of geology and engineering for drilling complex well under complex geological condition. The steering drilling, real-time optimizing drilling and dynamic diagnosis techniques while drilling, as well as the integration of above techniques are right ways for solving above problems. Based on the intelligent drill-string, an integrated steering-optimizing-diagnosis (SOD) system was proposed. The intelligent drill-string is an electric drill-string and can transport the parameters including more than 30 variables measured down-hole while drilling to surface control decision orders, or transport the orders to bottom hole at high rate about 104 bits to 106 bits per second. It also can simultaneously transmit electrical power from 10 to 250 kW as required to down-hole soft and hardware. The structural diagram of SOD system was given, and the functions of this system were described. This system can make the geological uncertain parameters clear and simplify the drilling process. The SOD system also can be used to analyze the mechanical behaviors of drill strings (especial BHA and drilling-tool) and precisely control hole's trajectory while drilling. The drilling process can be optimized, and the drilling effectiveness can be improved in application of the system. This system can be used to real-timely recognize and treat down-hole abnormalities. The drilling cost will be reduced by 20 percent in application of this system. (8 refs)

Database: Compendex

Data Provider: Engineering Village

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4. Simultaneous measurement of temperature and pressure using a single fiber Bragg grating based on reflected waves broadened bandwidth

Guo, Tuan (1); Qiao, Xueguang (1); Jia, Zhen'an (1); Sun, An (1); Chen, Changyong (1)

Source: *Guangxue Xuebao/Acta Optica Sinica*, v 24, n 10, p 1401-1405, October 2004; **Language:** Chinese; **ISSN:** 02532239; **Publisher:** Chinese Optical Society

Author affiliation: (1) Lab. of Optical Fiber Sensing, Sci. Sch., Xi'an Shiyou Univ., Xi'an 710065, China

Abstract: A novel approach for simultaneous measurement of temperature and pressure using a single fiber Bragg grating (FBG) based on reflected wave's broadened bandwidth is proposed and demonstrated. FBG is affixed on the non-uniformity strain area of double-hole cantilever beam by special polymer. Bragg reflected wavelength is shifted and reflected bandwidth is broadened by pressure change, while temperature change just leads to the shift of reflected wavelength. In the temperature range 20-100°C and pressure range 0-7.8 N, the precisions of temperature measure and pressure measure are $\pm 1.1^\circ\text{C}$ and ± 0.18 N respectively. The response curves of FBG have good linearity which are higher than 99.6%. Reflection spectrum has a steady figure through repeated measurement. (13 refs)

Main heading: Fiber Bragg gratings

Controlled terms: Cantilever beams - Light reflection - Optical sensors - Pressure measurement - Spectrum analysis - Temperature measurement

Uncontrolled terms: Broadened bandwidth - Optical sensing - Simultaneous measurement

Classification Code: 741.1 Light/Optics - 741.3 Optical Devices and Systems - 944.4 Pressure Measurements - 944.6 Temperature Measurements

Treatment: Applications (APP) - Theoretical (THR) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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5. Technology of fiber gratings sensing and its applications in petroleum industry

Guo, Tuan (1); Qiao, Xue-Guang (1); Jia, Zhen-An (1); Sun, An (1); Chen, Chang-Yong (1)

Source: *Journal of Test and Measurement Technology*, v 18, n 3, p 208-213, 2004; **Language:** Chinese; **ISSN:** 16717449; **Publisher:** Publ. Dept. of NCIT (North China Inst. of Technology)

Author affiliation: (1) Science School, Key Lab. of Optical Fiber Sensing, Xi'an Shiyou University, Xi'an 710065, China

Abstract: The responsive mechanism of fiber gratings to temperature and strain was analyzed. The principal technology of multi-parameter discriminating measurement and multiplex demodulation was reviewed. Considering the outstanding characteristics of fiber gratings sensing with the speciality of petroleum industry, the applications in petroleum industry were discussed, as follow: strain and temperature measurement, logging technology, seismo-detecting and long distance oil-pipeline detecting. (7 refs)

Main heading: Diffraction gratings

Controlled terms: Demodulation - Multiplexing - Petroleum industry - Seismology - Strain - Temperature measurement

Uncontrolled terms: Discriminating measurement - Fiber grating - Multiplex demodulation - Petroleum application - Sensing technology

Classification Code: 944.6 Temperature Measurements - 741.3 Optical Devices and Systems - 716

Telecommunication; Radar, Radio and Television - 713.3 Modulators, Demodulators, Limiters, Discriminators, Mixers - 511 Oil Field Equipment and Production Operations - 484.1 Earthquake Measurements and Analysis - 408.1 Structural Design, General

Treatment: Theoretical (THR) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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6. Liquid propellant high energy gas fracturing technique

Tian, Hejin (1, 2); Zhang, Xinqing (1); Zhang, Jie (1); Li, Dang (1)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 9, p 75-79+10-11, September 25, 2004; **Language:** Chinese; **ISSN:** 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Petroleum Engineering Institute, Xi'an Shiyou University (2) No. 18, Second Dianzi Road, Xi'an, Shaanxi(710065), China

Abstract: The liquid propellant high energy gas fracturing technique is a method of carrying out oil / gas well stimulation by use of the liquid high energy material being mainly composed of oxidant, combustion agent, solvent and some combustion sensitizer. The liquid propellant composition suitable to in-situ application was found through the selection of oxidant and combustion agent of the liquid propellant and through the optimal design calculation of liquid propellant formulation. The liquid propellant ignition and burning performance are expounded and the downhole liquid propellant ignition technology and its used volume are analyzed in the paper. The top pressures were only 50 - 60 MPa because of the liquid propellant's being slowly burned, and the downhole propellant-pack volume may be up to 500-1200 kg with a pressure duration of about 40 s. The wide and long fractures might be formed owing to a long pressure-maintaining period, the fracture lengths being ranged from 25 m to 50 m similar to the hydraulic fracture lengths. The productivity increasing ratios were 2.5 - 5 with a valid period of more than six months. Therefore it is specially applicable to the tight payzone fracturing in low permeability oil / gas reservoirs. The field test results of the liquid propellant high energy gas fracturing and its geological signification and economic returns are introduced in the paper.

Main heading: Fracturing (oil wells)

Controlled terms: Ignition - Liquid propellants - Mechanical permeability - Natural gas wells - Oil wells - Oxidation - Petroleum reservoirs - Pressure effects

Uncontrolled terms: High-energy gas - Pressure maintenance - Reservoir stimulation

Classification Code: 931.2 Physical Properties of Gases, Liquids and Solids - 802.2 Chemical Reactions - 523 Liquid Fuels - 521.1 Fuel Combustion - 512.2.1 Natural Gas Fields - 512.1.1 Oil Fields - 511.1 Oil Field Production Operations

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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7. Systematic cluster analysis method of evaluating oil/gas well postfracture response

Chen, Junbin (1, 2, 3); Xiao, Shuqin (2); Li, Dang (2); Qu, Zhan (2); Zhou, Fangde (1)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 10, p 56-58+8-9, October 25, 2004; **Language:** Chinese;

ISSN: 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Xi'an Jiaotong University (2) Xi'an Shiyou University (3) No. 18, Second Dianzi Road, Xi'an, Shaanxi (710065), China

Abstract: According to systematic cluster analysis method, the fractured well is regarded as the sample point but the geological parameters and engineering parameters of the fractured well are regarded as Euclidean coordinate of the sample point. A distance matrix reflecting the degree of likeness among sample points can be set up in light of Euclidean distance, and a likeness measure among classes may be established in accordance with the shortest distance method. So the cluster analysis can be carried out on the basis of those. Through evaluating the postfracture responses of eight fractured wells in Changqing Oil Field by use of such a method, it was concluded that the production of the oil/gas well with great kh value was high after being fractured, but it was also related to the formation pore volume, the oil/gas draining ability being low in the unstable production stage after being fractured because of ultralow formation porosity; the post-fracture response of the oil/gas well with high formation permeability was good; the postfracture response was fairly good if the sand content in proppant exceeded 35%; the greater the sand content per meter of formation thickness, the higher the production of oil/gas well after being fractured; and both numerous and thick muddy interbeds may be the other reason of causing the oil/gas well postfracture response bad. The conclusion mentioned above conforms to reality, so that such a method may be used for the evaluation, analysis and research on the oil/gas well postfracture response.

Main heading: Natural gas wells

Controlled terms: Fracturing (oil wells) - Geology - Oil wells - Pore size - Production engineering

Uncontrolled terms: Cluster analysis - Oil and gas wells - Postfracture response - Ultralow formation

Classification Code: 481.1 Geology - 511.1 Oil Field Production Operations - 512.1.1 Oil Fields - 512.2.1 Natural Gas Fields - 913.1 Production Engineering

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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8. Influence of perforation azimuth density and diameter on fracture width

Xu, Yuangang (1, 2)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 10, p 47-49+7, October 25, 2004; **Language:** Chinese; **ISSN:** 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Dept. of Educational Administration, Xi'an Shiyou University (2) No. 18, Second Dianzi Road, Xi'an, Shaanxi (710065), China

Abstract: The fracturing in casing perforated well is greatly different from that in open hole, and the fractures of the former started at the perforations only. Through laboratory experiment and field test, it was shown that the post-fracture response was directly affected by perforation parameters, and the fracture width was an important parameter reflecting the postfracture response. The ground stress distribution after perforation was discussed according to elastic mechanical theory, and, on the basis of this, a mathematical model expressing the relation between the fracture width and the perforation parameters was set up by applying fracture mechanical theory. The calculation results indicated that the fracture width was affected by perforation azimuth, density and diameter. When the geological conditions and wellbore space are fixed, there exist optimal perforation azimuth, density and diameter and while the perforation density and diameter exceed a certain of values, they do not almost affect the fracture width. Therefore, only in combining the optimization design of perforation parameters with that of fracturing parameters, can the postfracture response of perforated well be better. Through analyzing, it was pointed out that the influence of the wellbore spatial location and perforations' azimuth on ground stress redistribution are great, so that not only the influence of perforation azimuth, density and diameter on postfracture response but also the stability of perforations should be all considered, thus providing a certain of theoretical basis for the optimization design of perforation parameters of fractured well. (6 refs)

Main heading: Fracturing (oil wells)

Controlled terms: Mathematical models - Oil well casings - Oil wells - Parameter estimation - Stress concentration

Uncontrolled terms: Fracture width - Perforations - Spatial locations - Wellbores

Classification Code: 421 Strength of Building Materials; Mechanical Properties - 511.1 Oil Field Production Operations - 511.2 Oil Field Equipment - 512.1.1 Oil Fields - 731.1 Control Systems - 921 Mathematics

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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9. Research on a novel sand consolidating agent

Li, Qianding (1, 2); Zhang, Fuzhe (1)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 9, p 80-82+11, September 25, 2004; **Language:** Chinese;

ISSN: 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Chemical Engineering Institute, Xi'an Shiyou University (2) No. 18, East Sec., Second Dianzi Rd., Xi'an, Shaanxi (710065), China

Abstract: In order to change the conventional way that, directly catalyzed by sodium hydroxids, the acetone and furfural might be synthesized into furfural acetone resin, a new method called Phase Transfer Catalysis (PTC) is adopted so as to avoid the formation of explosive polymerization during synthesizing. Through synthesis, synthetic modification and blended combination, a kind of resin blended by furfural acetone resin and epoxy resin has been developed. It is of these characters as high temperature resistance, relatively high compression strength, small permeability loss and strong suitability, and, modified by polyurethane, its toughness and compression strength are greatly improved. The feasibility of solidifying the sands by use of the resin was studied and discussed by the authors. By taking the polyethylene polyamine and diethanolamine mixture (1 : 1) as the polyamine solidifying epoxy resin, when the mass of epoxy resin accounted for 5 percent of that of the sands and the mass proportion of the mixed polyamine to the epoxy resin was 1 : 5, some cracks were found in the sample after having been cured in the thermotank (65°C) for 24 h. The compression strength of the sample was 1.6 MPa and this value was too small to take account of its permeability. The results indicated that, at 65°C, when the optimally blended proportion of furfuryl acetone resin (FA) to epoxy resin (ER) in polyamine consolidating agent was 1 : 2.5, the compression strength of the sample was 3.9 MPa and its permeability was 3.0 μm^2 , the permeability loss rate being 40%; and while FA : ER=1 : 2.5 and the mass proportion of polyurethane A to polyurethane B was 2 : 1, along with the increase in quantity of polyurethane from 10 to 30 percent, the compression strength of the sample increased from 6.3 to 7.8 MPa with a rising trend, which doubled and redoubled that of the sample being not modified by polyurethane; and its permeability increased from 3.75 to 4.15 μm^2 , the permeability loss rate from 25 to 17 percent. (6 refs)

Main heading: Oil sands

Controlled terms: Acetone - Catalysis - Epoxy resins - High temperature effects - Mechanical permeability - Mixtures - Natural gas fields - Oil fields - Phase transitions - Polyurethanes - Sand consolidation - Sodium compounds - Synthesis (chemical)

Uncontrolled terms: Furfuryl acetone resin - Permeability loss rates

Classification Code: 815.1.1 Organic Polymers - 804.1 Organic Compounds - 802.3 Chemical Operations - 802.2 Chemical Reactions - 931.2 Physical Properties of Gases, Liquids and Solids - 801.4 Physical Chemistry - 512.1.1 Oil Fields - 512.1 Petroleum Deposits - 511.1 Oil Field Production Operations - 512.2.1 Natural Gas Fields

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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10. Disposing gasfield sewage containing methanol by oxidation flocculation-/ corrosion control-scale prevention technique

Yang, Zhigang (1, 3); Zhang, Ningsheng (2); Wu, Xinmin (2)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 10, p 114-117+17-18, October 25, 2004; **Language:** Chinese;

ISSN: 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Xi'an Jiaotong University (2) Xi'an Shiyou University (3) Letter Box No. 1585, Xi'an-jiaotong University, Xi'an, Shaanxi (710049), China

Abstract: Methyl alcohol has been used for controlling the formation of hydrate in gas production in Changqing Gas Field. In the course of gas processing, a part of methyl alcohol was vaporized into gas and the other dissolved in water to form the sewage containing methanol. The methyl alcohol in the sewage must be recovered and cyclically utilized, so as to reduce gas production cost. The gasfield sewage containing methanol is of high salinity, various ions (Ca²⁺, Mg²⁺, Cl⁻, HCO₃⁻ and so on) and a certain amount of dissolved gases (CO₂ and H₂S), so that there existed the phenomena of the pipeline's and equipment's being punched by corrosion and the rectification tower's being plugged by scaling in the course of operation of methyl alcohol recovery installation, thus influencing severely the safety in production of the installation. For this reason, an oxidation flocculation-/ corrosion control-scale prevention technique of disposing the sewage containing methanol in Changqing Gas Field is put forward in the paper. After the sewage's being disposed, the H₂S, mechanical impurity, oil, and total Fe content in it might be reduced from more than 28.6, 951.4, 239.4, and 125.95 mg/l to 0.01, 3.7, 1.4, and 0.001 mg/l; and its corrosion rate was decreased from 2.73 mm/a to less than 0.076 mm/a, and its scale prevention rate was up to 100%. Therefore the problems of scaling, plugging and corroding existing in the course of the methyl alcohol recovery and disposal of the sewage containing methanol in Changqing Gas Field may be fully solved by use of such a technique.

Main heading: Petroleum reservoirs

Controlled terms: Corrosion protection - Flocculation - Impurities - Methanol - Oxidation - Sewage

Uncontrolled terms: Corrosion control - Scale prevention - Sewage containing methanol

Classification Code: 452.1 Sewage - 512.1.1 Oil Fields - 539.2 Corrosion Protection - 802.2 Chemical Reactions - 802.3 Chemical Operations - 804.1 Organic Compounds

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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11. A study of the self-organization modeling of distributed manufacturing network

Li, Gang (1); Sun, Linyan (1); Li, Haiquan (2)

Source: *Proceedings of the IEEE International Conference on E-Commerce Technology for Dynamic E-Business, CEC-East 2004*, p 114-117, 2004, *Proceedings of the IEEE International Conference on E-Commerce Technology for Dynamic E-Business, CEC-East 2004*; **ISBN-10:** 0769522068, **ISBN-13:** 9780769522067; **Conference:** Proceedings of the IEEE International Conference on E-Commerce Technology for Dynamic E-Business, CEC-East 2004,

September 13, 2004 - September 15, 2004; **Sponsor:** IEEE Computer Society Technical Committee on Electronic Commerce; **Publisher:** IEEE Computer Society

Author affiliation: (1) School of Management, Xi'an Jiaotong University, Xi'an, 710049, China (2) School of Computer Science, Xi'an Shiyou University, Xi'an, 710065, China

Abstract: Distributed manufacturing network provides flexibility and agility in responding to customer demand shifts. The fundamental premise of this philosophy is: Self-organization behavior emerges from the interactions between multiple autonomous business entities represented in it. Self-organization behavior in the distributed manufacturing network leads the system to find a reasonable solution for complex manufacturing problems and evolve with changes. This paper proposes a three layer conceptual model of the distributed manufacturing network and develops agent based approaches for the modeling and problem solving of self-organization distributed manufacturing network. The coordination mechanism based on stigmergy and swarm intelligence in the system provides a high degree of flexibility and adaptability. (11 refs)

Main heading: Manufacturing data processing

Controlled terms: Artificial intelligence - Competition - Distributed database systems - Intelligent agents - Problem solving - Product development - Scheduling - Societies and institutions

Uncontrolled terms: Action coordination - Behavioral complexity - Distributed manufacturing network - Self-organization modeling

Classification Code: 921 Mathematics - 913.4 Manufacturing - 913.1 Production Engineering - 912.2 Management - 911.2 Industrial Economics - 901.1.1 Societies and Institutions - 723.4 Artificial Intelligence - 723.3 Database Systems - 723.2 Data Processing and Image Processing

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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12. Mathematical model for fluid filtration in formation under the condition of vibration

Zhang, Rong-Jun ; Pu, Chun-Sheng ; Dong, Zheng-Yuan

Source: *Shiyou Xuebao/Acta Petrolei Sinica*, v 25, n 5, p 80-83, September 2004; **Language:** Chinese; **ISSN:** 02532697; **Publisher:** Science Press

Author affiliation: (1) Xi'an Petroleum Univ., Xi'an 710065, China

Abstract: During the development of low-permeability and super low-permeability reservoirs, the inorganic and organic scale deposits, foreign particle and clay mineral often block the formation near oil wells and water injection wells. The vibration oil production technique is an effective physical method to release or relieve the formation blocking. By using the theories of conservation of momentum, conservation of energy and hydrokinetics, a mathematical model for describing the relationship among the fluid parameters, the formation parameters and the vibrant operation parameters was established. The analytic solutions of one-dimensional and radial transfusion equation for compressive and single-phase fluid flow through the compressive formation were obtained. The effects of each parameter on the vibrant operation were also gotten. On the basis of the above results, the computation models were established. The equation for pseudo-steady state flat radial deliver-ability under the condition of vibration boundary was used to calculate the average production. The simulation results agree with the actual data of oil field. (7 refs)

Database: Compendex

Data Provider: Engineering Village

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13. Enetrating case well testing technology

Liaoyuan, Guo (1); Jianguo, Ma. (1)

Source: *Well Testing*, v 13, n 2, p 26-27+75, April 25, 2004; **Language:** Chinese; **ISSN:** 10044388; **Publisher:** Well Testing

Author affiliation: (1) Petroleum Engineering Department, Xi'an Petroleum University

Abstract: CHDT wire line tester for cased well can penetrate through case, cement and formation for many times by once sequence. It can measure the formation's pressure, collect flow sample and plug the drilling hole promptly. All that can evaluate the reservoir conveniently.

Main heading: Wells

Controlled terms: Drilling - Petroleum reservoirs - Pressure effects - Technology - Testing

Uncontrolled terms: Fluid sample - Formation tester - Penetrating case - Test

Classification Code: 422.2 Strength of Building Materials : Test Methods - 446.1 Water Supply Systems - 512.1.1 Oil Fields - 604.2 Machining Operations - 901 Engineering Profession

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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14. Calculation and analysis of the hydraulically pushing force in rotary steerable drilling

Li, Qi (1, 2, 3); Zhang, Tiejun (1); Yu, Jiliang (3)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 9, p 68-71+9-10, September 25, 2004; **Language:** Chinese; **ISSN:** 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Petroleum Engineering Institute, Xi'an Shiyou University (2) Postdoctoral Sci. Res. Mobile Stn., Northwestern Polytech. University (3) Huanghe Drilling Company, Shengli Oil Field

Abstract: The composition and operating principle of the modulated rotary steerable drilling tool MRST being developed are introduced in the paper. It is composed of two parts, i. e. the measure and control nipple joint and the biased steering executive unit, and the steerable drilling may be carried out under the circumstances of fully rotary drilling string and lacking of relative-to-wellface stationary support point. The drilling fluid is taken as the steering power source of the biased steering executive unit of MRST, i. e. the hydraulically pushing force produced by the

internal-external pressure difference acted upon the telescopic segment of the executive unit, and the magnitude of the hydraulically pushing force is closely related the steering efficiency. For this reason, the magnitude of the hydraulically pushing force and its influence factors of MRST at normal drilling conditions were calculated and analyzed by use of the conventional drilling hydraulic calculation program. The results indicated that, in consideration of the existing conditions of land drilling equipment in China, the MRST being developed might meet the need of steering force control necessary to the wells with depths of less than 7000 m; however the hydraulically pushing force acted upon the telescopic segment of MRST was various with the change in well depth, discharge capacity, drilling fluid density and its rheological property, so, while applying the MRST in practice, we should consider the influence of the change in the above-mentioned factors on the operating behavior of the MRST; furthermore, the magnitude of the steering force of the MRST might be controlled by slightly adjusting the discharge capacity. (5 refs)

Main heading: Oil well drilling

Controlled terms: Drilling machines (machine tools) - Hydraulics - Oil fields - Petroleum engineering - Rheology - Steering

Uncontrolled terms: Hydraulically pushing forces - Rotary steerable drilling - Steering tools

Classification Code: 511 Oil Field Equipment and Production Operations - 512.1.1 Oil Fields - 512.1.2 Petroleum Deposits : Development Operations - 603.1 Machine Tools, General - 632.1 Hydraulics - 931.1 Mechanics

Treatment: Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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15. Damage of nondarcy flow on condensate reservoirs

Pu, Chunsheng (1, 1); Zhang, Rongjun (1); Nie, Cuiping (1); Shi, Yu (1)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 11, p 82-84+11-12, November 25, 2004; **Language:** Chinese;

ISSN: 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Petroleum Engineering College, Xi'an Petroleum University

Abstract: The damage of retrograde condensate pollution on condensate gas wells is a very important problem while condensate reservoirs are developed, which will decrease the productivity of the condensate gas wells and cause the recovery factor of condensate oil decreasing. Another major factor to influence condensate reservoir developing is non-Darcy flow, which will make the condensate oil precipitating, the porous channel plugging, and the permeability decreasing in the zones near the wells of condensate reservoirs. Deeply studying the above 2 problems, the article proposes the method to measure the level of retrograde condensate pollution by experiments quantitatively. Also, with the real data of someone condensate gas field, the reservoir engineering method is used to study the influence of turbulent flow on the condensate gas field, and the numeral simulation method is used to simulate the developing programs of the condensate gas field under different turbulence coefficients. With indexes comparing, the influence of non-Darcy's effect of gas wells on the developing results of condensate reservoirs is determined, and the quantitative study method of the influence of retrograde condensate pollution and non-Darcy's flow is obtained. It provides the theoretic reference for reasonable development of condensate reservoirs.

Main heading: Petroleum reservoirs

Controlled terms: Computer simulation - Condensation - Mathematical models - Mechanical permeability - Natural gas fields - Natural gas well production - Natural gas wells - Pollution - Productivity - Sustainable development - Turbulent flow

Uncontrolled terms: Condensate oil/gas fields - Non-Darcy flow - Productivity of gas wells - Retrograde condensation

Classification Code: 931.2 Physical Properties of Gases, Liquids and Solids - 921 Mathematics - 913.1 Production Engineering - 901.4 Impact of Technology on Society - 723.5 Computer Applications - 631.1 Fluid Flow, General - 512.2.1 Natural Gas Fields - 512.1.1 Oil Fields - 454.2 Environmental Impact and Protection

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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16. High sensitivity fiber Bragg grating pressure difference sensor

Fu, Haiwei (1, 2); Fu, Junmei (1); Qiao, Xueguang (2)

Source: *Chinese Optics Letters*, v 2, n 11, p 621-623, November 2004; **ISSN:** 16717694; **Publisher:** Science Press

Author affiliation: (1) Sch. of Electron. and Info. Eng., Xi'an Jiaotong Univ., Xi'an 710049, China (2) Sch. of Sci., Xi'an Shiyu Univ., Xi'an 710065, China

Abstract: Based on the effect of fiber Bragg grating (FBG) pressure difference sensitivity enhancement by encapsulating the FBG with uniform strength beam and metal bellows, a FBG pressure difference sensor is proposed,

and its mechanism is also discussed. The relationship between Bragg wavelength and the pressure difference is derived, and the expression of the pressure difference sensitivity coefficient is also given. It is indicated that there is good linear relation between the Bragg wavelength shift and the pressure difference of the sensor. The theoretical and experimental pressure difference sensitivity coefficients are 38.67 and 37.6 nm/MPa, which are 12890 and 12533 times of that of the bare FBG, respectively. The pressure difference sensitivity and dynamic range can be easily changed by changing the size, Young's modulus, and Poisson's ratio of the beam and the bellows. (7 refs)

Main heading: Fiber optic sensors

Controlled terms: Bellows - Elastic moduli - Electronics packaging - Encapsulation - Fiber Bragg gratings - Pressure measurement - Pressure transducers - Sensitivity analysis

Uncontrolled terms: Bragg wavelength shift - Pressure difference sensors

Classification Code: 714.2 Semiconductor Devices and Integrated Circuits - 731.1 Control Systems - 741.1.2 Fiber Optics - 741.3 Optical Devices and Systems - 944.3 Pressure Measuring Instruments - 944.4 Pressure Measurements

Treatment: Applications (APP)

Database: Compendex

Data Provider: Engineering Village

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17. Novel high sensitivity fiber Bragg grating pressure sensor

Fu, Hai-Wei (1, 2); Fu, Jun-Mei (1); Qiao, Xue-Guang (2)

Source: *Guangdianzi Jiguang/Journal of Optoelectronics Laser*, v 15, n 8, p 892-895, August 2004; **Language:**

Chinese; **ISSN:** 10050086; **Publisher:** Board of Optronics Lasers

Author affiliation: (1) Coll. of Electron. and Info. Eng., Xi'an Jiaotong Univ., Xi'an 710049, China (2) Coll. of Sci., Xi'an Shiyou Univ., Xi'an 710065, China

Abstract: A novel high sensitivity fiber Bragg gratings (FBG) pressure sensor was proposed based on linearity diaphragm. The relation between the central wavelength of reflection wave of FBG and pressure was given, and the expression of the pressure sensitivity coefficient was also given. The theoretical and experimental pressure sensitivity coefficients are -9.5 nm/MPa and -8.73 nm/MPa, which are 3166 and 2910 times of that of the bare fiber grating respectively. The experimental results agree with the theoretical ones. The sensor has good linearity. It is also pointed out that the pressure sensitivity can be changed by changing the size, Young's modulus and Poisson ratio of the diaphragm. (9 refs)

Main heading: Fiber Bragg gratings

Controlled terms: Pressure measurement - Sensitivity analysis - Strain

Uncontrolled terms: Fiber Bragg grating sensing - Pressure sensitivity coefficient

Classification Code: 741.3 Optical Devices and Systems - 944.4 Pressure Measurements

Treatment: Applications (APP) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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18. Influence of cold damage on gas well stimulation

Zhang, Xuanqi (1, 2, 3); Yu, Ligang (1)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 10, p 54-55+8, October 25, 2004; **Language:** Chinese; **ISSN:**

10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Xi'an Shiyou University (2) Inst. of Percolation Fluid Mechanics, Chinese Academy of Sciences (3) No. 18, Second Dianzi Road, Xi'an, Shaanxi (710065), China

Abstract: The influence of formation cold damage caused by the ultralow temperature of working fluid on gas well stimulation is studied in the paper. Through testing the water permeabilities of the gas reservoir cores collected from E' returnabilityerduosi Basin at a constant pressure and different temperatures as 45, 30, 25, 15 and 5°C, it was found that the core permeability reduced along with the decrease in temperature; the lower the primary permeability of the core, the larger the loss of the core permeability; the loss of the core permeability was the largest at about 5°C; and the primary permeability of the core couldn't be reinstated when the temperature returned from 5°C to 45°C. For this reason, the partial cold damage of gas reservoir is irreversible, in other words, the virgin state of the gas reservoir can't be reinstated. Then a returning experiment of fracturing fluid was carried out under the same experimental conditions. The returning effectiveness of fracturing fluid was poor at low temperature. It was deduced that the core permeability reduced greatly owing to the open microfractures' close-up caused by the change in pore structure in the core because of a sudden cold stimulus; and the poor returnability of fracturing fluid was caused by its low cementation-broken ability at low temperature. Therefore the failure of well stimulation is inevitable, or its ideal result can't be achieved, by the action of the both. Such a conclusion is useful for carrying out stimulation in winter. (6 refs)

Main heading: Natural gas wells

Controlled terms: Computer simulation - Fracturing (oil wells) - Mechanical permeability - Petroleum reservoirs - Thermal effects

Uncontrolled terms: Cold damage - Fracturing fluid - Gas wells - Stimulation

Classification Code: 511.1 Oil Field Production Operations - 512.1.1 Oil Fields - 512.2.1 Natural Gas Fields - 723.5 Computer Applications - 931.2 Physical Properties of Gases, Liquids and Solids

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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19. Vibration-acid fracturing complex stimulating technique

Zhang, Rongjun (1, 2, 3); Pu, Chunsheng (2); Nie, Cuiping (2); Shi, Yu (2)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 9, p 72-74+10, September 25, 2004; **Language:** Chinese;

ISSN: 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Department of Geology, Northwest University (2) Petroleum Engineering Institute, Xi'an Shiyou University (3) No. 18, Second Dianzi Road, Xi'an Shaanxi(710065), China

Abstract: The vibration oil-producing and acid fracturing techniques are the feasible stimulating ways in oil and gas field development. The former is to treat the oil reservoir by vibration waves, i. e. to increase oil well productivity so as to raise reservoir ultimate recovery factor through making up fractures by fracturing and reducing crude oil viscosity, and the latter is a commonly-used oil well stimulation of carbonate reservoirs which is, through pumping into hydrochloric acid at over breakdown pressure, to make up fractures or to open up the natural fractures, and, through the acidizing fluid's flowing in the open fractures and reacting with fracture surface from beginning to end, to form finally the fractures with a certain length and a certain acid etching flow guiding ability, thus raising the percolation capability of the reservoir. Because some unfavourable factors as low formation permeability and high crude oil viscosity, etc, have been generally faced in developing the carbonate oil reservoirs containing viscous crude and / or high solidification point oil, it will be a very effective method to combine large power vibration waves with acid fracturing technique. Through investigation, it was considered that this method may reduce crude oil viscosity, raise formation flow guiding ability and solve the problems which can't be solved by the conventional methods, so that it is of great importance to increasing production of the viscous crude and / or high solidification point. oil in carbonate oil reservoirs. (4 refs)

Main heading: Oil field development

Controlled terms: Etching - Fracturing (oil wells) - Natural gas fields - Oil wells - Petroleum reservoirs - Solidification - Vibrations (mechanical) - Viscosity of liquids

Uncontrolled terms: Acidizing - Conventional acid fracturing - Deep acid fracturing - Vibration stimulating - Vibration waves

Classification Code: 931.2 Physical Properties of Gases, Liquids and Solids - 931.1 Mechanics - 802.3 Chemical Operations - 802.2 Chemical Reactions - 631.1 Fluid Flow, General - 512.2.1 Natural Gas Fields - 512.1.2 Petroleum Deposits : Development Operations - 512.1.1 Oil Fields - 511.1 Oil Field Production Operations

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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20. The self-organization of dynamic manufacturing network

Li, G. (1); Sun, L.-Y. (1); Li, H.-Q. (2)

Source: *ICMA 2004 - Proceedings of the International Conference on Manufacturing Automation: Advanced Design and Manufacturing in Global Competition*, p 469-476, 2004, *ICMA 2004 - Proceedings of the International Conference on Manufacturing Automation: Advanced Design and Manufacturing in Global Competition*; **ISBN-10:** 1860584683,

ISBN-13: 9781860584688; **Conference:** ICMA 2004 - International Conference on Manufacturing Automation: Advanced Design and Manufacturing in Global Competition, October 26, 2004 - October 29, 2004; **Sponsor:** National Natural Science Foundation of China, NSFC, China; K C Wong Education Foundation, Hong Kong, China; **Publisher:** Professional Engineering Publishing Limited

Author affiliation: (1) School of Management, State Key Laboratory of Mechanical Manufacturing System Engineering, Xi'an Jiaotong University, China (2) School of Computer Science, Xi'an Shiyou University, China

Abstract: A variety modeling approaches assume a relatively static manufacturing network structure and focus on optimizing the flow in the DMN (dynamic manufacturing network). These techniques are unable to model structural and behavioral dynamics of a DMN and little is known about how different manufacturing networks evolve and adapt. In this

paper, it proposed a new paradigm for modeling and analysis of the DMN based on the self-organization paradigm. The diverse time-varying structures of a DMN emerge with the interaction of the enterprises with various goal directed behavior to fulfill the stochastic global demand. The DMN co-evolves over time and the environment. There is a co-symbiosis relationship among the various enterprises of the DMN. A simulation model based on multiagent approach indicates the emergence, co-evolution and co-symbiosis of the DMN. © Professional Engineering Publishing 2004. (26 refs)

Main heading: Factory automation

Controlled terms: Computer simulation - Mathematical models - Multi agent systems - Optimization - Random processes - Time varying systems

Uncontrolled terms: Behavioral dynamics - Dynamic manufacturing network (DMN) - Simulation model - Stochastic global demand

Classification Code: 723.5 Computer Applications - 731.1 Control Systems - 913.4.2 Computer Aided Manufacturing - 921 Mathematics - 921.5 Optimization Techniques - 922.1 Probability Theory

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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21. Methods to confirm the starting pressure gradient for low permeability reservoir non-darcy flow

Gan, Qingming (1); Cheng, Zhen (1); Cheng, Suimin (1)

Source: *Well Testing*, v 13, n 3, p 1-4+74, June 25, 2004; **Language:** Chinese; **ISSN:** 10044388; **Publisher:** Well Testing

Author affiliation: (1) Rsrc. and Petrol. Eng. Institute, Xi'an Petroleum Institute

Abstract: The development for low permeability field will become one of the development emphasis for a quite long time from now. This paper systematically discusses and evaluates the starting pressure gradient of low permeability reservoir low speed non-darcy flow.

Main heading: Pressure effects

Controlled terms: Low permeability reservoirs - Magnetic permeability - Petroleum engineering - Petroleum reservoirs

Uncontrolled terms: Low permeability field - Low speed non-darcy flow - Starting pressure gradient

Classification Code: 511 Oil Field Equipment and Production Operations - 512.1.1 Oil Fields - 701.2 Magnetism: Basic Concepts and Phenomena

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

Compilation and indexing terms, Copyright 2023 Elsevier Inc.

22. Technology and application of high energy multiple pulse over-balanced perforating

Zhang, Jie (1, 3, 3); Liao, Hongwei (2, 3); Xue, Zhongtian (3); Zhang, Xinqing (3)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 23, n SUPPL., p 86-88+11, April 30, 2004; **Language:** Chinese; **ISSN:** 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Southwest Petroleum University (2) Xi'an Communication University (3) Xi'an Petroleum University

Abstract: High energy multiple pulse perforating uses burning of high-energy fuel to produce pressure 1.2 ~ 1.5 times higher than the formation breaking pressure before beginning to perforate. Then the compensating bullet burns to add pressure to extend and erode the perforated tunnels, and produce fractures uncontrolled by the earth stress. The article introduces the basic principle of the technology and the structural design of the facilities, and provides some real cases using the technology in Zhongyuan oil field. Its application shows the technology has the advantages of over-balanced perforating with nitrogen boosting, easy operation, low cost, and obvious production increasing. According to the statistics of 20 wells, the average production increases 3.5 times. (4 refs)

Main heading: Well perforation

Controlled terms: Costs - High pressure effects - Natural gas - Nitrogen - Oil fields - Stress analysis - Technology

Uncontrolled terms: Application - Multiple pulse - Over-balanced perforating - Stimulation techniques

Classification Code: 911 Cost and Value Engineering; Industrial Economics - 901 Engineering Profession - 804 Chemical Products Generally - 931.2 Physical Properties of Gases, Liquids and Solids - 522 Gas Fuels - 446.1 Water Supply Systems - 421 Strength of Building Materials; Mechanical Properties - 512.1.1 Oil Fields

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village
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23. Control system in rotary steering drilling tool based on state space method

Tang, Nan ; Huo, Ai-Qing ; Cui, Qi-Lin

Source: *Shiyou Xuebao/Acta Petrolei Sinica*, v 25, n 2, p 89-92, March 2004; **Language:** Chinese; **ISSN:** 02532697;

Publisher: Science Press

Author affiliation: (1) Indust. Automat. Dept., Xi'an Petroleum Univ., Xi'an 710065, China

Abstract: The modulated rotary steering drilling system is characterized by that the steering vector force is obtained by moving three extension blocks in the desired direction and space under the condition of simultaneous rotation of steering tool with drilling string. So, it is necessary to have a stabilized platform in the tool to obtain steady angle adjustable and independent to the rotation of drilling string. In order to ensure the state variables required in the process of rotary steering drilling, a control way for the stabilized platform based on state feedback system was introduced and discussed. An objective mathematical model for the stabilized platform was established, and the control system was simulated and tested. The reliability and possibility of the control method for the stabilized platform in the rotary steering drilling have been proved. (9 refs)

Database: Compendex

Data Provider: Engineering Village

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24. Nonlinear global optimization based on bisection method

Song, Julong (1); Gan, Xiaobing (2); Song, Guoxiang (3)

Source: *Journal of Information and Computational Science*, v 1, n 2, p 229-233, December 2004; **ISSN:** 15487741;

Publisher: Sun Yat-sen (Zhongshan) University

Author affiliation: (1) Sch. of Sci., Xi'an Shiyou Univ., Xi'an 710065, China (2) Mgmt. Coll., Shenzhen Univ., Shenzhen 518060, China (3) Sch. of Sci., Xidian Univ., Xi'an 710071, China

Abstract: Based on bisection method and fractal, a new algorithm for finding global minimum of a multimodal function in a closed interval is developed, which searches only a little intervals for finding the global minimum. The convergence of the algorithm is given. Numerical results show that the method is practical and effective. (6 refs)

Main heading: Global optimization

Controlled terms: Computer hardware - Convergence of numerical methods - Fractals - Nonlinear systems - Theorem proving

Uncontrolled terms: Bisection method - Congeneric algorithm - Deterministic methods - Multidimensional function - Multimodal function - Nonlinear global optimization

Classification Code: 721.1 Computer Theory, Includes Formal Logic, Automata Theory, Switching Theory, Programming Theory - 722 Computer Systems and Equipment - 723.4 Artificial Intelligence - 731.1 Control Systems - 921.5 Optimization Techniques - 921.6 Numerical Methods

Treatment: Applications (APP)

Database: Compendex

Data Provider: Engineering Village

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25. Strain response of a special cantilever-based fibre Bragg grating

Sun, An (1); Qiao, Xue-Guang (1); Jia, Zhen-An (1); Guo, Tuan (1); Chen, Chang-Yong (1)

Source: *Guangdianzi Jiguang/Journal of Optoelectronics Laser*, v 15, n 2, p 153-155, February 2004; **Language:**

Chinese; **ISSN:** 10050086; **Publisher:** Board of Optronics Lasers

Author affiliation: (1) Optical Fibre Sensing Lab., Xi'an Petroleum Univ., Xi'an 710065, China

Abstract: Strain characteristic of a special hollow aluminium alloy cantilever were analyzed. The fibre Bragg grating (FBG) is stucked to the thin arm of the cantilever and its stress response is observed through OSA when adding load to the free end of the cantilever. The result show that the wavelength of FBG shifts about 0.215 nm when the load is 200 g; and when the cantilever is solid, the wavelength shifts only 0.019 nm. It can be conclude that enhanced-stress sensitivity can be reached through this special structure when using elastic material to coat fibre grating. (8 refs)

Main heading: Fiber Bragg gratings

Controlled terms: Aluminum alloys - Cantilever beams - Optical sensors - Sensitivity analysis - Stress analysis

Uncontrolled terms: Enhanced stress sensitivity - Stress responsive

Classification Code: 421 Strength of Building Materials; Mechanical Properties - 741.3 Optical Devices and Systems - 921 Mathematics - 931.1 Mechanics

Treatment: Applications (APP) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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26. Demodulation system for fiber Bragg grating sensors based on tunable filtering technique

Chen, Chang-Yong (1); Qiao, Xue-Guang (1); Jia, Zhen-An (1); Zhao, Da-Zhuang (1); Fu, Hai-Wei (1); Guo, Tuan (1); Sun, An (1)

Source: *Guangdianzi Jiguang/Journal of Optoelectronics Laser*, v 15, n 7, p 778-781, July 2004; **Language:** Chinese; **ISSN:** 10050086; **Publisher:** Board of Optronics Lasers

Author affiliation: (1) Optical Fiber Sensing Lab., Xi'an Petroleum Univ., Xi'an 710065, China

Abstract: A novel wavelength detection scheme is developed with the technique of dynamic filtering in scanning mode and of synchronous process in time domain, which is based on a tunable fiber grating. The system adopts a fiber grating tuning apparatus with separate tuning executor and wavelength monitor, applies the method of synchronous filtering and process, and achieve high performance with low cost as a demodulator of fiber grating sensors. It wavelength resolution is 3 pm, the measured strain resolution is 2.55 μ its measurable range reaches 9.16 nm, and scanning time is less than 200 ms. (12 refs)

Main heading: Fiber Bragg gratings

Controlled terms: Cantilever beams - Demodulation - Optical sensors - Time domain analysis

Uncontrolled terms: Dynamic filtering - Tunable filtering - Wavelength detection

Classification Code: 408.2 Structural Members and Shapes - 741.3 Optical Devices and Systems

Treatment: Applications (APP) - Theoretical (THR) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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27. Approach for lowering the damage to reservoir in test

Jihui, Li (1); Guojun, Li (2)

Source: *Well Testing*, v 13, n 1, p 64-65+78, February 25, 2004; **Language:** Chinese; **ISSN:** 10044388; **Publisher:** Well Testing

Author affiliation: (1) Xi'an Petroleum University (2) Yang Junyan Linpan Recovery Factory, Shengli Oilfield

Abstract: The paper analyzes the actors causing damage to oil and gas layers, summarizes the method for losing the disturbance to formation in low permeability layers of Shanghe oilfield. According to the actual case in the test, comprehensively utilizing methods of perforation, acid and fracture, reform and recovery has been done to damage formations. That can decrease the damage and increase testing efficiency.

Main heading: Petroleum reservoirs

Controlled terms: Acids - Fracturing (oil wells) - Mechanical permeability - Oil bearing formations - Oil fields - Oil well testing - Protection - Recovery - Well perforation

Uncontrolled terms: Damage formations - Oil and formation - Oil production tests - Protection method

Classification Code: 511.1 Oil Field Production Operations - 512.1.1 Oil Fields - 512.1.2 Petroleum Deposits : Development Operations - 803 Chemical Agents and Basic Industrial Chemicals - 804 Chemical Products Generally - 931.2 Physical Properties of Gases, Liquids and Solids

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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28. Lithology identification based on wavelet packet theory during drilling

Wang, Qian-Long ; Wang, Ye ; Feng, Quan-Ke ; Qu, Zhan

Source: *Shiyou Xuebao/Acta Petrolei Sinica*, v 25, n 3, p 91-94, May 2004; **Language:** Chinese; **ISSN:** 02532697; **Publisher:** Science Press

Author affiliation: (1) Sch. of Energy and Power Eng., Xi'an Jiaotong Univ., Xi'an 710049, China (2) China Inst. of Atomic Energy, Beijing 102413, China (3) Xi'an Shiyou Univ., Xi'an 710065, China

Abstract: A new lithology identification method based on axial amplitude modulation signal of drill string is proposed. The background noise on drilling string is easy to be induced. The axial amplitude modulation signal can be produced while drilling in rock formation with different lithology by using three-cutter bit. The wavelet packet multilevel-decomposition method was applied to threshold filter. The best wavelet coefficient vector is analyzed by fast Fourier

transform, and the modulated feature is extracted from the corrupted signal. The central frequency and sideband frequency are detected on spectrum figure. The number of complex tooth on bit corresponding to different lithology of rock has been obtained. The effective and fast lithology discrimination has been realized. (8 refs)

Database: Compendex

Data Provider: Engineering Village

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29. Function of nodal analysis software in gas well of WTES and Its application

Jiang, Kaijun (1); Dai, Jiang (1); Zhang, Yan (1); Huang, Wei (2)

Source: *Well Testing*, v 13, n 4, p 93-96+110, August 25, 2004; **Language:** Chinese; **ISSN:** 10044388; **Publisher:** Well Testing

Author affiliation: (1) Well Test. and Recovery Oil Sub-Co., Daqing Oilfield Ltd. (2) Xi'an Petroleum University

Abstract: The paper introduces the function of nodal analysis software in gas well of WTES and its actual application. By this software, integrated analysis and interpretation to production system can determine effective extent of every parameter to all system and optimize production, increase production rate. The field example proved that it is much practiced and advanced.

Main heading: Gases

Controlled terms: Computer software - Optimization - Parameter estimation - Production - Wells

Uncontrolled terms: Nodal analysis - Producing potential - Sensitivity parameter - Software

Classification Code: 446.1 Water Supply Systems - 723 Computer Software, Data Handling and Applications - 731.1 Control Systems - 913.1 Production Engineering - 921.5 Optimization Techniques - 931.2 Physical Properties of Gases, Liquids and Solids

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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30. Thinking and understanding of perfecting and developing compound fluid drilling technique

Yang, Zhenjie (1, 2, 4); Zhang, Xifeng (2); Yue, Yanhua (3); Zhang, Jianqing (3); Peng, Gurong (3); Lui, Zhaoli (3)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 10, p 50-53+7-8, October 25, 2004; **Language:** Chinese; **ISSN:** 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Postdoctoral Sci. Res. Mobile Stn., Changqing Petrol. Exploration Bureau (2) Petroleum Engineering Institute, Xi'an Shiyou University (3) Drilling Company, Changqing Petrol. Exploration Bureau (4) No. 18, Second Dianzi Road, Xi'an, Shaanxi (710065), China

Abstract: It is very important for high efficiency low-cost drilling of the complicated lost-circulation zone to improve and perfect the compound fluid drilling technique to open up its application scope and give full play to its technical potential. In the paper, through analyzing the domestic and foreign relevant literatures, the advantages and constraint factors of applying the compound fluid drilling technique are emphatically expounded in combination with the authors' loss-circulation-control-operating experiences. The key points of improving and perfecting the technique include: to raise the influence of well control fluid on both borehole wall stability and anti-gas channeling ability through optimizing the annular well control fluid system; and to optimize the technological parameters and to set up the related auxiliary technology and the on-site monitoring measures. The field operating results indicated that, through improving the compound fluid drilling technique, it could be well used for various complicated strata to ensure the downhole and well-control safety in the process of operating on the spot; and, especially for the complicated well of the coexistence of well blowout and vicious lost-circulation, its well control safety could be guaranteed more reliably by use of such a technique. The technical idea and method mentioned in the paper are of guide significance for well utilizing and perfecting the compound fluid drilling technique. (10 refs)

Main heading: Well drilling

Controlled terms: Boreholes - Constraint theory - Costs - Monitoring - Reliability

Uncontrolled terms: Compound fluid drilling - Drilling engineering - Loss circulation control - Lost circulation

Classification Code: 421 Strength of Building Materials; Mechanical Properties - 446.1 Water Supply Systems - 501.1 Exploration and Prospecting Methods - 721.1 Computer Theory, Includes Formal Logic, Automata Theory, Switching Theory, Programming Theory - 911 Cost and Value Engineering; Industrial Economics

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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31. Influence of pressure-sensitive effect on productivity of low permeable sand gas reservoirs

Zheng, Weishi (1, 2); Liu, Yifei (1)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 12, p 113-115+16, December 25, 2004; **Language:** Chinese; **ISSN:** 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Petroleum Engineering College, Xi'an Petroleum University (2) No. 18, 2nd Diangzi Rd., Xi'an, Shaanxi (710065), China

Abstract: Stress sensitivity means the influence of pressure difference produced by joint working of the matrix stress and the porous fluid pressure on the porous microstructure. The porous structure of low permeable reservoirs is more complicated than that of high permeable reservoirs, which enhances the complexity of the behaviors while the core is compressed. The effective pressure changes continuously as the reservoir pressure decreases due to exploitation. The effective pressure decides the degree of stress sensitivity. In pressure sensitivity experiments, the confining pressure is altered to simulate the variation of the pressure borne by the reservoir. The influence of pressure variation on the permeability of the reservoir is investigated. Based on the experimental results, the experiencing relation between the effective pressure and the permeability is established. Then the productivity formula and the pressure distribution formula are derived considering the pressure sensitivity for low permeable sand gas reservoirs. Also, the influence of pressure sensitivity on the productivity of low permeable sand gas reservoirs is analyzed.

Main heading: Petroleum reservoirs

Controlled terms: Mathematical models - Mechanical permeability - Microstructure - Natural gas - Porosity - Pressure effects - Sand - Stress analysis

Uncontrolled terms: Low permeable reservoirs - Porous structure - Pressure variation - Stress sensitivity

Classification Code: 933 Solid State Physics - 931.2 Physical Properties of Gases, Liquids and Solids - 921

Mathematics - 522 Gas Fuels - 512.1.1 Oil Fields - 483.1 Soils and Soil Mechanics - 421 Strength of Building Materials; Mechanical Properties

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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32. Verification of dynamic reserves for heterogeneous complex gas reservoirs with low permeability

Wang, Weihong (1, 2, 3); Shen, Pingping (2); Ma, Xinhua (2); Fan, Lihong (2); Tang, Junwei (2)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 7, p 80-82+10-11, July 25, 2004; **Language:** Chinese; **ISSN:** 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Xi'an Petroleum University (2) E and D Research Institute, PCL (3) 20 Xueyuan Rd., Beijing (100083), China

Abstract: Aiming to the problem of the dynamic reserves being hard to verify for the high and low permeable zones in the heterogeneous gas reservoirs with low permeability, the material balance equation is established for composite gas reservoirs. With cumulative production method, a new method to calculate the dynamic reserves for the heterogeneous gas reservoirs with low permeability is proposed. Using the method, the dynamic reserves of high permeable zone and low permeable zone can be verified respectively for the heterogeneous gas reservoirs with low permeability. The complement gas volume from the low permeable zone to the high permeable zone can be estimated in different recovering time, which offers the ground for reasonable production allocation of gas wells. With real cases, it is demonstrated the method is simple and practical, meets the engineering accuracy requirements, and has important significance for the development of the heterogeneous gas reservoirs with low permeability.

Main heading: Natural gas well production

Controlled terms: Materials balance - Materials science - Mechanical permeability - Oil fields - Petroleum reservoirs

Uncontrolled terms: Heterogeneous reservoirs - Material balance equation - Reserve calculating

Classification Code: 512.1.1 Oil Fields - 512.2.1 Natural Gas Fields - 802 Chemical Apparatus and Plants; Unit Operations; Unit Processes - 931.2 Physical Properties of Gases, Liquids and Solids

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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33. Application and developing direction of Ai technology in oil and gas industry

Cheng, Suimin (1, 3); Cheng, Zhen (1); Li, Shubai (2)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 7, p 115-117+14, July 25, 2004; **Language:** Chinese; **ISSN:** 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Xi'an Petroleum University (2) E and D Research Institute, PCL (3) 18 Dianzi Second Rd., Xi'an, Shaanxi (710065), China

Abstract: At first, the article briefly introduces the application and development of artificial intelligence (AI) technology, the solution of traditional problems with AI, the difference between AI and human knowledge, and the classification of applying AI technology. Then, the applicable methods are proposed for AI technology to solve the complicated problems of heterogeneity, diversification, variability, imprecision and uncertainty in oil and gas exploration and production. And the classification of AI - applying fields is made. At last, the new methods and developing direction of AI - applying technology are suggested. (12 refs)

Main heading: Artificial intelligence

Controlled terms: Crude petroleum - Expert systems - Gases - Natural resources exploration - Neural networks - Pattern recognition - Production

Uncontrolled terms: Complicated systems - Exploration - Human knowledge

Classification Code: 913.1 Production Engineering - 723.4.1 Expert Systems - 723.4 Artificial Intelligence - 931.2 Physical Properties of Gases, Liquids and Solids - 716 Telecommunication; Radar, Radio and Television - 461.1

Biomedical Engineering - 444 Water Resources - 512.1 Petroleum Deposits

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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34. Establishment of sharing system and environment of drilling knowledge

Li, Qi (1, 2, 3); He, Huacan (2)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 10, p 151-153+21, October 25, 2004; **Language:** Chinese; **ISSN:** 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Northwest Industry University (2) Xi'an Petroleum University (3) No. 18, E. Sect., Dianzi Second Rd., Xian, Shanxi (710065), China

Abstract: Gathering the experience and knowledge of drilling experts and information taking from large data, a sharing system of drilling knowledge will be established on the internal internet of oil/gas fields for the field operating persons to obtain and share the knowledge, which will play important role to improve the drilling decision-making level. The article introduces the concept of knowledge sharing system and indicates the key link to establish the knowledge sharing system is to build the network circumstance connecting every drilling unit, make the standards and protocols of knowledge managing and sharing, handle and maintain the system by a qualified expert team. Special stress is made to change the current working mode, and create the application environment of knowledge sharing for drilling technicians to obtain the required decision-making supports to their decision at anytime and anywhere. The system will change the traditional drilling decision-making mode. So, the drilling technicians may not be limited by time or space. With knowledge sharing, the existing knowledge and experience will be used fully to make the optical drilling decision in time. (4 refs)

Main heading: Natural gas well drilling

Controlled terms: Computer networks - Data reduction - Decision making - Internet - Knowledge based systems - Natural gas fields - Oil well drilling - Petroleum reservoirs

Uncontrolled terms: Network circumstance connecting - Optical drilling - Sharing systems

Classification Code: 723.4.1 Expert Systems - 723.2 Data Processing and Image Processing - 722 Computer Systems and Equipment - 912.2 Management - 512.2.2 Natural Gas Deposits: Development Operations - 512.1.2 Petroleum Deposits : Development Operations - 512.1.1 Oil Fields - 512.2.1 Natural Gas Fields

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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35. Simulation experiment on oil recovery mechanism in pressure fluctuation

Wang, Jie ; Jin, You-Huang ; Jiang, Hua-Yi ; Liu, Li-Xia ; Chen, Jian-Fa

Source: *Shiyou Xuebao/Acta Petrolei Sinica*, v 25, n 2, p 93-95, March 2004; **Language:** Chinese; **ISSN:** 02532697; **Publisher:** Science Press

Author affiliation: (1) Lanzhou Inst. of Geology, Chinese Acad. of Sci., Lanzhou 730000, China (2) Xi'an Petroleum Univ., Xi'an 710065, China

Abstract: With the development of tertiary oil recovery technique, pressure fluctuation has become an important new technique for enhancing oil recovery. By means of high frequency pulsation pressure servo system, the effect of pressure fluctuation on rock wettability was researched experimentally. The wettability of core before and after vibration was qualitatively and quantitatively analyzed. It is concluded that pressure fluctuation considerably affects core wettability, namely the wettability of core after vibration varies from neutrality to water wettability and from weak hydrophilicity to strong water wettability. (9 refs)

Database: Compendex

Data Provider: Engineering Village

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36. Damage of residual water on permeability of tight gas reservoir

Ren, Xiaojuan (1, 3); Zhang, Ningsheng (1); Zhang, Xifeng (1); Li, Tiantai (1); Zhu, Jinzhi (2); Yin, Da (2); Zou, Shengli (2)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 11, p 106-108+15, November 25, 2004; **Language:** Chinese;

ISSN: 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Xi'an Petroleum University (2) Talimu Oil Field Branch, PCL (3) No. 18, Diangzi Rd. 2, Xi'an, Shaanxi (710065), China

Abstract: Residual water is one of the most damages to the permeability of tight gas reservoirs. Taking the tight gas reservoir in Kela block as example, the damage of different residual water, such as free water, bound water, adsorbed water etc. , on the permeability of tight gas reservoirs is investigated. The results show the damage of bound water on the permeability of tight gas reservoirs in Kela block is the most severe. The lower the permeability is, the severer the damage is. It is difficult for the damage of bound water and adsorbed water on the permeability of tight gas reservoirs to be eliminated. The best way to decrease the damage of residual water on the permeability of tight gas reservoirs is reducing water invasion, or using economic fitting non-water fluid such as methanol, CO₂, N₂ etc. So far, there are few effective methods to eliminate the damage of residual water on tight gas reservoirs if water invades them. (10 refs)

Main heading: Low permeability reservoirs

Controlled terms: Adsorption - Carbon dioxide - Mechanical permeability - Methanol - Natural gas - Petroleum reservoirs - Water

Uncontrolled terms: Bound water - Formation damage - Tight gas reservoirs - Water-locking effect

Classification Code: 931.2 Physical Properties of Gases, Liquids and Solids - 804.2 Inorganic Compounds - 804.1 Organic Compounds - 802.3 Chemical Operations - 522 Gas Fuels - 512.1.1 Oil Fields - 512.1 Petroleum Deposits - 481.1 Geology - 444 Water Resources

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

Compilation and indexing terms, Copyright 2023 Elsevier Inc.

37. Optimization of trajectory control methods for extended reach well-bore

Di, Qinfeng (1, 3); Gao, Deli (2)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 6, p 74-76+10-11, June 25, 2004; **Language:** Chinese; **ISSN:** 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Appl. Math. and Mechanics Institute, Shanghai University, Xi'an Petroleum University (2) China Petroleum University (3) 149 Yanchang Rd., Shanghai (200072)

Abstract: Aiming to the problem of trajectory control techniques for extended reach well-bore, the trajectory control techniques used for 4 extended reach well-bores in XJ24-3 oil field are analyzed in the paper, The mechanism of trajectory control techniques for extended reach well-bore is discussed. And trajectory control programs for extended reach well-bore are optimized. The results indicate the trajectory control technology for extended reach well-bore used in XJ24-3 oil field is virtually the combination of the steering techniques of modulated or non- modulated slid-steering BHA and the rotary steer-able drilling system. The steer-able rotary drilling system can control the well path timely and accurately, but it is too expensive. The continuous steering technology with a slid-steering BHA can get good application if the changing rule of its steering force can be well understood. It is determined by the technical and economic factors that the slid-steering technology should be used when the displacement is small and the rotary steering technology should be used when the displacement is big, which is the optimum trajectory control program for extended reach well-bore.

Main heading: Oil wells

Controlled terms: Boreholes - Control systems - Oil fields - Oil well drilling - Optimization - Problem solving

Uncontrolled terms: Extended reach - Rotary steering - Slid-steering - Trajectory control program - Well bores - XJ24-3 oil fields

Classification Code: 501.1 Exploration and Prospecting Methods - 512.1.1 Oil Fields - 512.1.2 Petroleum Deposits : Development Operations - 723.4 Artificial Intelligence - 921.5 Optimization Techniques

Treatment: Theoretical (THR) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

Compilation and indexing terms, Copyright 2023 Elsevier Inc.

38. Formation damage mechanisms of low - Permeability gas reservoir and its preventive measures

Wang, Zhiwei (1, 2, 4); Zhang, Ningsheng (2); Lu, Hongbo (3)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 23, n SUPPL., p 28-31+3-4, April 30, 2004; **Language:** Chinese;

ISSN: 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) University of Petroleum, Beijing (2) Xi'an Petroleum University (3) Northwest Petroleum Bureau (4) No. 18, Second Dianzi Road, Xi'an, Shaanxi (710065), China

Abstract: The particularity of the formation damage caused in the processes of the drilling, completion and development of low-permeability gas reservoir is more evident than that of oil reservoir, because of the small flowing pores, poor permeability, large percolation resistance and strong interaction of solid-liquid interface and gas-liquid interface in the low-permeability gas reservoir. It is an effective preventive basis to recognize correctly the formation damage mechanisms of the low-permeability gas reservoirs. On the basis of investigating widely the relevant documents, four main factors of causing the formation damage for low-permeability gas reservoir, i. e. liquid retention, stress sensitivity, water sensitivity and reverse natural suction effect, are generalized; their damage mechanisms are analyzed; and the methods of preventing various formation damages are discussed in the paper. Through research, it was shown that the liquid retention damage is the first and fundamental damage factor; and caused by the stress sensitivity, the change in rock permeability is irreversible. In order to prevent the occurrence of low-permeability gas reservoir's being damaged, it is necessary to avoid using the well-entered liquids being able to cause the liquid retention and water sensitivity damages for the gas reservoirs and it should be comprehensively considered to draw up plans systematically according to the conditions of the gas reservoirs. (8 refs)

Main heading: Petroleum reservoirs

Controlled terms: Drilling - Flow interactions - Mechanical permeability - Mechanisms - Oil bearing formations - Percolation (fluids) - Rocks - Stress analysis - Water

Uncontrolled terms: Damage mechanism - Liquid retention - Low-permeability gas reservoir - Preventive measure

Classification Code: 931.2 Physical Properties of Gases, Liquids and Solids - 631.1 Fluid Flow, General - 604.2 Machining Operations - 601.3 Mechanisms - 512.1.1 Oil Fields - 483.1 Soils and Soil Mechanics - 481.1 Geology - 444 Water Resources - 421 Strength of Building Materials; Mechanical Properties

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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39. Estimation of failure probability of oil and gas pipeline with defects by Monte-Carlo simulation

Dong, Yuhua (1); Yu, Datao (2); Gao, Huilin (3)

Source: *Jixie Gongcheng Xuebao/Chinese Journal of Mechanical Engineering*, v 40, n 2, p 136-140, February 2004;

Language: Chinese; **ISSN:** 05776686; **DOI:** 10.3901/jme.2004.02.136; **Publisher:** Editorial Office of Chinese Journal of Mechanical Engineering

Author affiliation: (1) Univ. of Petroleum, Beijing 102249, China (2) Tubular Goods of Res. Ctr., CNPC, China (3) Xi'an Petroleum Inst., Xi'an 710000, China

Abstract: Monte-Carlo sampling technique is employed to investigate relationship among random variables such as crack depth, ratio of crack depth to length, fracture toughness, yield strength, transmission pressure and failure probability of oil and gas pipeline with defects. And criticality importance analysis of fault tree analysis is used to evaluate sensitivity of the random variables. The results show that the fracture toughness and crack depth have significant effect on failure probability of pipeline, and the ratio of crack depth to length. The influence of strength-mismatched factor of welded joint is considered. And annual failure probabilities of different failure modes are evaluated. (12 refs)

Main heading: Gas pipelines

Controlled terms: Cracks - Failure (mechanical) - Fracture toughness - Monte Carlo methods - Pressure - Probability - Sensitivity analysis

Uncontrolled terms: Failure mode - Failure probability - Monte Carlo sampling technique - Random variables - Strength match - Transmission pressure - Welded joint - Yield strength

Classification Code: 619.1 Pipe, Piping and Pipelines - 922.1 Probability Theory

Treatment: Applications (APP)

Database: Compendex

Data Provider: Engineering Village

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40. Predicting model of the limiting flux for the charged solute in ultrafiltration process

Luo, Ming-Liang (1); Guo, Yan (1); Pu, Chun-Sheng (2); Lu, Feng-Ji (1)

Source: *Journal of Hydrodynamics*, v 16, n 2, p 124-129, April 2004; **ISSN:** 10016058; **Publisher:** China Ocean Press

Author affiliation: (1) Environmental and Chem. Eng. Sch., Xi'an Jiaotong Univ., Xi'an 710049, China (2) Petroleum Eng. Sch., Xi'an Petroleum Univ., Xi'an 710065, China

Abstract: In the process of ultrafiltration, the occurrence of the limiting flux is elucidated with the formation of a cake (gel) layer on the membrane surface. Before cake formation, the pressure drop on the concentration polarization layer, as well as the permeate flux, increases with the applied pressure. The pressure drop on the concentration polarization layer, however, will no longer change with the applied pressure after the formation of the cake layer. The limiting flux will be obtained if the hydrodynamic conditions in the filtration channel are not affected by the cake layer. A mathematics model for predicting the limiting flux for the charged solute in ultrafiltration is developed. In this model, a repulsive electric force is taken into account in addition to convection and diffusion when the solute is carrying the same charge as the membrane material. A procedure to correlate the model with experimental ultrafiltration data is also present. The results show that a model in this paper is developed on a more realistic perception of the ultrafiltration system and the predicting data agrees well with experimental data. (10 refs)

Main heading: Ultrafiltration

Controlled terms: Diffusion in liquids - Fluxes - Mathematical models - Membranes - Pressure drop - Simulation

Uncontrolled terms: Cake formation - Charged solute - Concentration polarization - Limiting flux - Permeate flux

Classification Code: 631.1 Fluid Flow, General - 802.3 Chemical Operations - 921 Mathematics

Treatment: Applications (APP) - Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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41. Well-bore stability prediction of under-balanced drilling for Sulige Gas Field in Changqing Oil Field

Di, Qinfeng (1, 2); Zhao, Yerong (3); Lei, Tong (3); Wang, Changning (3); Zhang, Hanlin (3)

Source: *Tianranqi Gongye/Natural Gas Industry*, v 24, n 2, p 8-9+70-72, February 25, 2004; **Language:** Chinese; **ISSN:** 10000976; **Publisher:** Natural Gas Industry Journal Agency

Author affiliation: (1) Applied Math. and Mechanics Inst., Shanghai University, 149 Yanchang Rd., Shanghai (200072), China (2) Xi'an Petroleum Institute (3) Changqing Petroleum Explor. Bureau

Abstract: For the purpose of reducing pollution to gas reservoir and speeding exploration of Sulige Gas Field, both under-balanced and horizontal drilling techniques were used in Changqing Oil Field. So, the problem of well-bore stability happened for the horizontal section. The More - Coulomb criterion, Drucker - Prager criterion and Lade criterion were used to predict the well-bore stability of well Suping 1 in Sulige gas field. The results show that Lade criterion obtains the best prediction for the critical density of drilling fluids, and the uncertainty of the vertical stress is the most important factor that effects the prediction accuracy of the well-bore stability of well Suping 1. The proper range to predict the vertical stress is between 60 MPa and 65 Mpa. (2 refs)

Main heading: Gas industry

Controlled terms: Boreholes - Density (specific gravity) - Oil field development - Oil well drilling - Petroleum prospecting - Petroleum reservoirs - Pollution control - Pressure effects - Stresses

Uncontrolled terms: Lade criterion - Sulige gas field - Under balanced drilling - Vertical stress - Well-bore stability

Classification Code: 511.1 Oil Field Production Operations - 511.2 Oil Field Equipment - 512.1.1 Oil Fields - 512.1.2 Petroleum Deposits : Development Operations - 522 Gas Fuels - 931.2 Physical Properties of Gases, Liquids and Solids

Treatment: General review (GEN)

Database: Compendex

Data Provider: Engineering Village

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42. Theory and experiment about in-fiber Bragg grating temperature sensing

Qiao, Xue-Guang ; Jia, Zhen-An ; Fu, Hai-Wei ; Li, Ming ; Zhou, Hong

Source: *Wuli Xuebao/Acta Physica Sinica*, v 53, n 2, p 494-497, February 2004; **Language:** Chinese; **ISSN:** 10003290; **Publisher:** Science Press

Author affiliation: (1) Sch. of Sci., Xi'an Petroleum Univ., Xi'an 710065, China (2) Sch. of Electron. and Info. Eng., Xi'an Jiaotong Univ., Xi'an 710049, China

Abstract: A theoretical method of in-fiber Bragg grating temperature sensing has been proposed. Based on a temperature sensing model of in-fiber Bragg gratings, it was deduced that the analytical formulae of first-order and second-order and effective linear sensitivity coefficients of in-fiber Bragg grating temperature sensing. The theoretical values of each sensitivity coefficient were calculated. Conic multinomial has been obtained by experiment. The results of theory and experiment were compared and analyzed. Furthermore, the influence of quartzose mechanical parameters on temperature sensing characters of in-fiber Bragg gratings and the application range of linear and nonlinear relations of reflected wavelength versus temperature were also discussed. (18 refs)

Database: Compendex

Data Provider: Engineering Village

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43. Stress sensitivity enhanced in-fiber Bragg grating pressure sensor

Fu, Hai-Wei (1, 2); Qiao, Xue-Guang (2); Jia, Zhen-An (2); Zhao, Da-Zhuang (2); Fu, Jun-Mei (1)

Source: *Zhongguo Jiguang/Chinese Journal of Lasers*, v 31, n 4, p 473-476, April 2004; **Language:** Chinese; **ISSN:** 02587025; **Publisher:** Science Press

Author affiliation: (1) Sch. of Electron. and Info. Eng., Xi'an Jiaotong Univ., Xi'an 710049, China (2) Dept. of Info. Sci., Xi'an Petroleum Inst., Xi'an 710065, China

Abstract: To enhance the sensitivity of the in-fiber Bragg grating (FBG) sensor is one of the effective ways to improve the resolution of the FBG sensing system. Based on effect of FBG stress sensitivity enhancement by encapsulating the FBG with elastic polymer and a metal bellows, a novel model of high-sensitivity FBG pressure sensor is proposed. The relation between relative shift of Bragg wavelength and the pressure applied on the sensor is derived, and the analytical expression of pressure sensitivity coefficient is also given. It indicates that the relation between the relative shift of Bragg wavelength and applied pressure is linear, and the pressure sensitivity coefficient can be enhanced by properly selecting the parameters of the elastic part and the metal bellows, such as the elastic modulus of the elastic part and the elastic constant of the bellows, and the size of them. The experimental pressure sensitivity coefficient of the sensor is $-4.35 \times 10^{-9} \text{ Pa}^{-1}$ (-6.74 nm/MPa), which is 2197 times of that of the bare FBG, the theoretical value of the sensor is $-4.6 \times 10^{-9} \text{ Pa}^{-1}$. They fit each other very well. (12 refs)

Main heading: Fiber Bragg gratings

Controlled terms: Fiber optic sensors - Polymers - Pressure measurement - Sensitivity analysis - Stress analysis

Uncontrolled terms: Infiber Bragg grating - Optical fiber sensing - Pressure sensitivity coefficient - Stress sensitivity enhancement

Classification Code: 741.1.2 Fiber Optics - 741.3 Optical Devices and Systems - 921 Mathematics - 944.4 Pressure Measurements

Treatment: Applications (APP) - Theoretical (THR) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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44. High-sensitivity in-fiber Bragg grating pressure sensor

Fu, Haiwei (1, 2); Qiao, Xueguang (2); Jia, Zhen'an (2); Fu, Junmei (1)

Source: *Guangxue Xuebao/Acta Optica Sinica*, v 24, n 2, p 187-189, February 2004; **Language:** Chinese; **ISSN:** 02532239; **Publisher:** Chinese Optical Society

Author affiliation: (1) Sch. of Electron. and Info. Eng., Xi'an Jiaotong Univ., Xi'an 710049, China (2) Dept. of Info. Sci., Xi'an Petroleum Inst., Xi'an 710065, China

Abstract: Based on in-fiber Bragg grating sensing model, a high-sensitivity in-fiber Bragg grating pressure sensor was proposed by using uniform strength beam and bellow. The analytical formulae between pressure and relative shift of Bragg wavelength of in-fiber Bragg grating were derived. The pressure sensitivity coefficients were also obtained by analytical formulae and experiment respectively. The theoretical and experimental pressure sensitivity coefficients can reach $1.476 \times 10^{-2} \text{ Mpa}^{-1}$ and $1.35 \times 10^{-2} \text{ Mpa}^{-1}$, which are 7455 and 6808 times of that of the bare-fiber grating respectively. The experimental result fits the theoretical one well. At the same time, it is pointed out that the pressure sensitivity coefficients of this kind of sensor can be very large by regulating the parameters of strength beam and bellow till the in-fiber Bragg gratings are damaged. (12 refs)

Main heading: Fiber Bragg gratings

Controlled terms: Bellows - Cantilever beams - Fiber optics - Pressure measurement - Sensitivity analysis

Uncontrolled terms: Guided wave and fiber optics - Infiber Bragg grating pressure sensor - Infiber Bragg gratings - Pressure sensitivity coefficient

Classification Code: 741.1.2 Fiber Optics - 741.3 Optical Devices and Systems - 921 Mathematics - 944.4 Pressure Measurements

Treatment: Applications (APP) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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45. Power Flow Analysis on Simplified Feeder Modeling

Liu, Jian (1); Pengxiang, Bi (2); Yanqing, Zhang (1); Xiaomeng, Wu (3)

Source: *IEEE Transactions on Power Delivery*, v 19, n 1, p 279-287, January 2004; **ISSN:** 08858977; **DOI:** 10.1109/TPWRD.2003.820179; **Publisher:** Institute of Electrical and Electronics Engineers Inc.

Author affiliation: (1) Xi'an Univ. of Sci. and Technology, Xi'an 710054, China (2) Northwest Elec. Pwr. Staff Univ., Xi'an JiaoTong University, Xi'an 710054, China (3) Xi'an Petroleum University, Xi'an 710065, China

Abstract: Three novel models to simplify distribution network analysis are presented including equivalent load model (ELM), equivalent load density model (ELDM), and discrete equivalent load density model (DELDM). The voltages and the power on/through both ends of a feeder are used to describe the load and its distribution pattern within the feeder line. Only real time field data from feeder circuit breakers in substations and sectionalizing switches along the feeder lines are needed to obtain a satisfied analysis result. The loads on the feeder are represented by one load in ELM. Six fundamental load distribution patterns are put forward in ELDM. By solving the voltage drop function and the power loss function of the feeder line, characteristic values together with the corresponding similarity parameters for the six load distribution patterns are obtained, respectively. Weighting values for the six load distribution patterns are calculated, respectively. Consequently, voltage drop and line loss can be acquired without needing the data from each distribution transformer on the feeder line. Based on above method, a discrete equivalent load density model is advanced to improve the property. Examples are also given with comparison with other approaches showing the feasibility of the proposed methods. (9 refs)

Main heading: Electric network analysis

Controlled terms: Automation - Computational methods - Electric circuit breakers - Electric loads - Electric potential - Electric power distribution - Electric reactors - Electric transformers - Functions - Switching circuits

Uncontrolled terms: Equivalent load density models (ELDM) - Equivalent load models (ELM)

Classification Code: 731 Automatic Control Principles and Applications - 713.4 Pulse Circuits - 706.1.2 Electric Power Distribution - 921 Mathematics - 704.2 Electric Equipment - 703.1.1 Electric Network Analysis - 701.1 Electricity: Basic Concepts and Phenomena - 704.1 Electric Components

Treatment: Theoretical (THR)

Database: Compendex

Data Provider: Engineering Village

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46. Histogram-based adaptive filter for removing image noise

Wang, Bao-Ping (1, 2); Fan, Jiu-Lun (3); Xie, Wei-Xin (4); Liu, Sheng-Hu (1)

Source: *Tien Tzu Hsueh Pao/Acta Electronica Sinica*, v 32, n 7, p 1176-1179, July 2004; **Language:** Chinese; **ISSN:** 03722112; **Publisher:** Chinese Institute of Electronics

Author affiliation: (1) Sch. of Electron. Eng., Xi'an Shiyou Univ., Xi'an 710065, China (2) Sch. of Electron. Eng., Xidian Univ., Xi'an 710071, China (3) Dept. of Info. and Control, Xi'an Inst. of Post and Telecom., Xi'an 710061, China (4) Inst. of Info. Eng., Shenzhen Univ., Shenzhen 518060, China

Abstract: The performance of the existing filters will badly deteriorate in removing additive impulse noise, such as Gauss impulse noise and long-tailed impulse noise. Therefore, a new method for image restoration is presented. The new method can be used to estimate histogram of original image through input image, and gets a membership through this histogram by using fuzzy set theory, then establishes a weighted fuzzy mean filter through this membership. The new method effectually utilizes the prior knowledge of the original image, and can adaptively adopt different filter scale in the light of character divergence of image region and intensity of impulsive noise. The performance of the new method is compared with conventional filters and available fuzzy filters. Experimental result shows that the performance of the new method is better. (8 refs)

Main heading: Image reconstruction

Controlled terms: Adaptive filtering - Computer simulation - Digital filters - Fuzzy sets - Membership functions - Spurious signal noise

Uncontrolled terms: Fuzzy filters - Histograms - Image noise - Impulsive noise

Classification Code: 716.1 Information Theory and Signal Processing - 723.2 Data Processing and Image Processing - 723.5 Computer Applications - 741 Light, Optics and Optical Devices - 921 Mathematics

Treatment: Applications (APP) - Theoretical (THR) - Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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47. Pressure and temperature sensing system based on fiber-optic bragg gratings for the oil and gas downhole

Zhang, Xiangdong (1); Li, Yulin (1); Wang, Weiping (1); Hong, Xinhua (1); Liu, Tong (1); Wu, Cuiqin (2); Qiao, Xueguang (3)

Source: *Proceedings of SPIE - The International Society for Optical Engineering*, v 5279, p 636-640, 2004, APOC

2003: *Asia-Pacific Optical and Wireless Communications: Optical Fibers and Passive Components*; **ISSN:** 0277786X;

DOI: 10.1117/12.521652; **Conference:** APOC 2003: Asia-Pacific Optical and Wireless Communications: Optical Fibers and Passive Components, November 4, 2003 - November 6, 2003; **Sponsor:** SPIE; COS Chinese Optical Society (China); Wuhan Municipal Government (China); **Publisher:** SPIE

Author affiliation: (1) Xi'an Inst. of Opt./Prec. Mechanics, C A S, 710068, China (2) Xi'an Res. Inst. Hi-tech Hongqing T., Xi'an, 518060, China (3) Xi'an Petroleum Institute, Xi'an, 710065, China

Abstract: A pressure and temperature sensing system based on fiber-optic Bragg grating sensors for the oil and gas downhole is reported in this paper, the weak pressure sensitivity is enhanced and the cross-sensitivity of temperature and pressure measurands is overcome by an optimally designed mechanical enhancing and compensating structure, the working principle, experimental setup and testing results are also given. (8 refs)

Main heading: Optical systems

Controlled terms: Crude petroleum - Fiber Bragg gratings - Fiber optic sensors - Fiber optics - Multiplexing - Real time systems

Uncontrolled terms: Fiber-optic Bragg gratings - Oil and gas downholes - Temperature and pressure sensors

Classification Code: 512.1 Petroleum Deposits - 716 Telecommunication; Radar, Radio and Television - 722.4 Digital Computers and Systems - 741.1.2 Fiber Optics - 741.3 Optical Devices and Systems

Treatment: Experimental (EXP)

Database: Compendex

Data Provider: Engineering Village

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48. Control principle and servo platform performance analysis of modulated rotary steerable drilling system

Han, Lai-Ju ; Wang, Rui-He ; Liu, Xin-Hua ; Cui, Qi-Lin

Source: *Shiyou Daxue Xuebao/Journal of the University of Petroleum China*, v 28, n 5, p 49-51+60, October 2004;

Language: Chinese; **ISSN:** 10005870; **Publisher:** University of Petroleum, China

Author affiliation: (1) Coll. of Petroleum Eng., Univ. of Petroleum, Dongying 257061, China (2) Drilling Technol. Res. Inst., Shengli Oilfield, Dongying 257017, China (3) Sch. of Electron. Eng., Xi'an Petroleum Univ., Xi'an 710065, China

Abstract: The control principle of the servo platform in modulated rotary steerable drilling system was studied. A control system of servo platform composed of upper and lower turbo-dynamotors, platform control axis and electronic storehouse was designed. The theoretical analysis and analogue simulation results show that the platform could keep itself stabilized and has good controllable and visible characteristics. Moreover, the system still has good tracing capacity and anti-jamming capacity when the drilling parameters change in a wide range. (6 refs)

Database: Compendex

Data Provider: Engineering Village

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49. Effect of structure refinement by addition of refiner on LCF properties of cast superalloy K4169

Huang, Tai-Wen (1); Liu, Lin (1); Yang, Ai-Min (2); Xiong, Yu-Hua (3); Zhao, Zhi-Long (1)

Source: *Cailiao Gongcheng/Journal of Materials Engineering*, n 11, p 22-27, November 2004; **Language:** Chinese;

ISSN: 10014381; **Publisher:** Beijing Institute of Aeronautical Materials (BIAM)

Author affiliation: (1) Lab. of Solidification Proc., Northwestern Polytech. Univ., Xi'an 710072, China (2) Dept. of Mech. Eng., Xi'an Petroleum Inst., Xi'an 710065, China (3) Dept. of Mech. Eng., Tsinghua Univ., Beijing 100084, China

Abstract: The ingots of cast superalloy K4169 was refined with the addition of a trace of intermetallic compounds to the melt under conventional casting condition. The low cycle fatigue (LCF) properties were tested both for normal and refined test bars. The results show that the grains can be refined to ASTM 1.7. As a result, LCF life of refined test bars is 1.2-2 times compared to that of normal ones at room temperature. As a contrast, LCF properties at 700°C are different, depending on the total strain amplitude. LCF life for refined samples are superior than coarse ones at small total strain amplitude, and inferior at high total strain amplitude. Fatigue data fluctuation is improved of fined grains at all conditions. (14 refs)

Database: Compendex

Data Provider: Engineering Village

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50. Cast structure and mechanical properties of fine grained superalloy K4169 by addition of refiners (Open Access)

Liu, Lin (1); Huang, Taiwen (1); Xiong, Yuhua (2); Yang, Aimin (3); Zhao, Zhilong (1); Zhang, Rong (1); Li, Jinshan (1)

Source: *Proceedings of the International Symposium on Superalloys*, p 493-500, 2004, SUPERALLOYS 2004 - *Proceedings of the Tenth International Symposium on Superalloys*; DOI: 10.7449/2004/superalloys_2004_493_500;

Conference: SUPERALLOYS 2004 - Tenth International Symposium on Superalloys, September 19, 2004 - September 23, 2004; **Sponsor:** The Minerals, Metals and Materials Society, TMS; **Publisher:** Minerals, Metals and Materials Society

Author affiliation: (1) State Key Laboratory of Solidification Processing, Northwestern Polytechnical University, Xi'an 710072, China (2) Beijing General Research Institute for Non-Ferrous Metals, Beijing 100088, China (3) Department of Mechanical Engineering, Xi'an Petroleum Institute, Xi'an 710065, China

Abstract: Grain size and microstructural features of cast superalloy K4169 were investigated under various melting and casting conditions together with the addition of grain refiners. It is found that lowering the pouring temperature and adding refiners to the melt before pouring can lead to grain refinement of γ matrix and improve the proportion of equiaxed grains. At a conventional pouring temperature of 1400°C, the average size of equiaxed grains could be refined to the order of ASTM 3.2 (0.17 mm), the proportion of equiaxed grains at the transverse cross-section could be improved from 56% to 99% with addition of a trace intermetallic compound into the melt. The results also indicate that the length of primary dendrite is shortened with the addition of refiners, but the secondary dendrite arm spacing keeps almost unchanged. Meanwhile, the microsegregation of main elements such as Fe, Cr, Nb, Mo and Ti is alleviated with the decrease in grain size, and the grains have transformed from dendrite to granulation in fine-grained castings. The amount of microporosity in samples with the addition of refiners can be greatly reduced. The mechanisms of grain refinement and increase in equiaxed grain proportion were proposed. Tensile properties at room temperature and at 700°C were tested. The rupture strength, yield strength, elongation and reduction of area for refined grains are all more superior to those of coarse ones. Whereas the elongation and reduction of area of fine grained samples decrease at 700°C. Low cycle fatigue (LCF) properties of refined grain samples at room temperature are improved significantly. In addition, the degree of dispersion of LCF data of fined grain samples is diminished. (28 refs)

Main heading: Superalloys

Controlled terms: Casting - Grain boundaries - Grain growth - Grain size and shape - Investment casting - Microstructure - Molten materials - Solidification - Tensile strength

Uncontrolled terms: Centrifugal loads - Grain refinement - Low cycle fatigue (LCF) - Shear dendrites

Classification Code: 421 Strength of Building Materials; Mechanical Properties - 531 Metallurgy and Metallography - 531.2 Metallography - 534.2 Foundry Practice - 802.3 Chemical Operations - 931.2 Physical Properties of Gases, Liquids and Solids - 933.1.2 Crystal Growth

Treatment: Theoretical (THR) - Experimental (EXP)

Open Access type(s): All Open Access, Bronze, Green

Database: Compendex

Data Provider: Engineering Village

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