

Title (en)
Method for dimensioning a drilling riser

Title (de)
Verfahren zur Dimensionierung eines Bohrlochrisers

Title (fr)
Méthode de dimensionnement d'un riser de forage

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Application
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Abstract (en)
A design is chosen from a loads book and its apparent weight calculated. If the tension loads on the disconnected assembly are near a preset safety limit, the Von-Mises constraints are calculated for each tube section when it is connected. If these are near the tube material's elastic limit, each component is checked for the maximum tension, fatigue and dynamic loads imposed on the assembly Sizing a riser (1) connecting a seabed wellhead (2) to a floating support (7) via a main tube (8) comprises: (a) selecting the complete architecture of the riser using a book of loads, in particular to determine the thickness of the main tube and the type of float, and calculating the apparent weight of the assembly; (b) determining a safety margin on the tension of the assembly when it is disconnected from the wellhead, taking into account the apparent weight and the amplified tension at the head by movements of the floating support from which the assembly is suspended; (c) calculating the Von-Mises constraints in each section of the tube when it is connected to the wellhead, when the when the margin is near a preset value; and (d) when the constraints are near a predetermined criterion relative to the elastic limit of the tube material, obtaining the riser tube architecture and checking each component for compatibility with the maximum tension, fatigue and dynamic loads imposed on the assembly. The floatation device is modified until the margin of tension in the disconnected state is extended to the preset value, by varying the number of floats, the division of floats, the float diameter, or the density of the float material. The tube thickness is varied until the Van-Mises constraints approach the preset criteria of less than 2/3 of the elastic limit of the main tube steel. The calculations allow for a loss of thickness of the main tube and a loss of buoyancy of the floats. The margin is at least equal to 20 tonnes.

Abstract (fr)
La présente invention concerne une méthode pour dimensionner un ensemble prolongateur (1) pour le forage en mer reliant une tête de puits sous-marine (2) à un support flottant (7) comprenant un tube principal (8), dans laquelle on effectue les étapes suivantes: on choisit une architecture complète de l'ensemble prolongateur à partir d'un cahier des charges, notamment en se fixant l'épaisseur du tube principal et des moyens de flottaison, et on calcule le poids apparent de cet ensemble, on détermine la marge de tension en tête de l'ensemble, en mode déconnecté de la tête du puits, compte tenu du poids apparent et de la tension amplifiée en tête par les mouvements du support flottant auquel est suspendu l'ensemble, dans le cas où la marge de tension correspond à une valeur proche d'une valeur déterminée, on calcule les contraintes de Von-Mises dans toutes les sections du tube, en mode connecté à la tête du puits, dans le cas où les contraintes sont proche d'un critère déterminé en relation avec la limite élastique du matériau du tube: on vérifie par calcul la charge sur chaque composant de l'ensemble prolongateur, ainsi que sa fatigue en dynamique.
<IMAGE>

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• [Y] GB 2342938 A 20000426 - INST FRANCAIS DU PETROLE [FR]
• [A] WO 0058598 A1 20001005 - PGS OFFSHORE TECHNOLOGY AS [NO], et al
• [XY] WYBRO, P., DAVIES, K.: "The Dorado Field Production Risers", SPE 11549, December 1982 (1982-12-01), XP002188781
• [A] GARDNER, T., KOTCH, M.: "Dynamic Analysis of Risers by the Element Method", SPE 6310, 3 May 1976 (1976-05-03), XP002188782
• [A] FERNANDES: "UP-TO-DATE SPREADSHEET PROGRAM FOR PRELIMINARY ANALYSIS OF FLEXIBLE AND STEEL CATENARY RISERS USING CATENARY CONCEPTS", September 1997, COMPUTATIONAL MECHANICS PUBLICATION, SOUTHAMPTON BOSTON, XP001059619

Cited by
CN103958818A; EP2474468A1; CN108961430A; US9151121B2

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