

Title (en)

Method and system for material degradation detection in an object by analyzing acoustic vibration data

Title (de)

Verfahren und System zur Materialzersetzungserkennung in einem Objekt durch Analyse von Schallschwingungsdaten

Title (fr)

Procédé et système pour la détection de dégradation de matériau dans un objet par l'analyse de données de vibration acoustique

Publication

**EP 2628895 A1 20130821 (EN)**

Application

**EP 12000950 A 20120214**

Priority

EP 12000950 A 20120214

Abstract (en)

The invention claims a method and a system for material degradation detection in an object (11, 12) of said material by analyzing acoustic vibration data (VD) from said object (11, 12). The method comprises the following steps: - training (100) a supervised learning machine (5) to recognize said acoustic vibration data (VD) without material degradation by extraction of at least one time-frequency feature (FF) of said acoustic vibration data (VD), - detecting (101) said acoustic vibration data (VD) from said object (11), - converting (102) said acoustic vibration data (VD) to a time-frequency domain representation (FR), - extracting (105) at least one time-frequency feature (FF) of the time-frequency representation (FR) which is characteristic for said material degradation and - detecting (106) by the learning machine (5) if the value of the extracted at least one time-frequency feature (FF) of the time-frequency domain representation (FR) is novel compared to the value of the time-frequency feature (FF) of the training. The invention provides the advantage of robust material degradation detection under severe environmental conditions. With the method or system corrosion of down-hole pipes can be detected exactly and robustly.

IPC 8 full level

**E21B 47/00** (2012.01)

CPC (source: EP US)

**E21B 47/006** (2020.05 - EP US)

Citation (applicant)

- EP 1097290 B1 20040707 - SAUDI ARABIAN OIL CO [SA]
- EP 1467060 A1 20041013 - HALLIBURTON ENERGY SERV INC [US]

Citation (search report)

- [A] US 4893286 A 19900109 - COBB WESLEY N [US]
- [X] GERT VAN DIJCK ET AL: "Information Theory Filters for Wavelet Packet Coefficient Selection with Application to Corrosion Type Identification from Acoustic Emission Signals", SENSORS, vol. 11, no. 6, 27 May 2011 (2011-05-27), pages 5695 - 5715, XP055032996, DOI: 10.3390/s110605695
- [X] DINO ISA ET AL: "Pipeline defect detection using support vector machines", 6TH WSEAS INTERNATIONAL CONFERENCE ON CIRCUITS, SYSTEMS, ELECTRONICS, CONTROL & SIGNAL PROCESSING, 29 December 2007 (2007-12-29), Cairo, Egypt, pages 162 - 168, XP055032994, Retrieved from the Internet <URL:http://www.wseas.us/e-library/conferences/2007egypt/papers/568-369.pdf> [retrieved on 20120717]

Cited by

US2022163958A1; US11822325B2; US11713671B2; WO2019087125A1

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated extension state (EPC)

BA ME

DOCDB simple family (publication)

**EP 2628895 A1 20130821**

DOCDB simple family (application)

**EP 12000950 A 20120214**