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Leak Detector System for Positive Airway Pressure Machines MEMS Pressure Sensors: Fabrication and Process Optimization *API Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms Development of an Indwelling Intracranial Pressure Sensor* **Pressure and Temperature Sensitive Paints** Micro Mechanical Transducers **Sensor Technology Handbook Pressure Sensor for Use in the Loss-of-Fluid-Test (LOFT) Reactor Frequency Response of Two Types of Liquid-metal Pressure Transducers with Standoff Tubes** Industrial Pressure, Level, and Density Measurement **Feasibility of Miniaturizing a Heater for a Thin-film Oxygen Partial-pressure Sensor** Measuring Shallow Water Waves with Pressure Sensors **Pressure Sensors** An Evaluation of Existing Tire Pressure Monitoring Systems Poly-SiGe for MEMS-above-CMOS Sensors **Stainless Steel Capacitive Pressure Sensors for Harsh Environment Applications Introduction to Sensors for Electrical and Mechanical Engineers IBM System Blue Gene Solution: Blue Gene/Q Hardware Installation and Maintenance Guide** Proceedings of the Second International Conference on Press-in Engineering 2021, Kochi, Japan **Official Gazette of the United States Patent and Trademark Office** Experimental Investigation of Means for Reducing the Response of Pressure Transducers to Thermal Transients Indwelling and Implantable Pressure Transducers **Summary Report of Pressure Sensor for the Loss of Fluid Test (LOFT) Reactor FT4 Gas Turbine Engine Installation Handbook General Sensor Technology/force and Pressure Sensors** Methods for the Dynamic Calibration of Pressure Transducers **Atmospheric Pressure Jumps Measured with Arrays of Sensitive Pressure Sensors in the Vicinity of Chicago's O'Hare International Airport Flight Testing of a Luminescent Surface Pressure Sensor** St.George Basin OCS (Outer Continental Shelf) Oil and Gas Lease Sale No.70 *Ion Based Pressure Sensor for Pulse Detonation Engines* Proposed 1977 Outer Continental Shelf Oil and Gas Lease Sale, Gulf of Mexico Outer Continental Shelf Lands Act Amendments of 1977 **Proposed Environmental Impact Statement** *Draft environmental impact statement* **OCS (Outer Continental Shelf) Oil and Gas Lease Sale No.65, 1978 (FL,AL,MS,LA) Pervasive Computing** Automechanics **Assessment of Fiber Optic Pressure Sensors Implementation of Soil Pressure Sensors in Large-Scale Soil-Structure Interaction Studies Microfabrication of an Intraocular Pressure Sensor**

NASA ARC has conducted flight tests of a new type of aerodynamic pressure sensor based on a luminescent surface coating. Flights were conducted at the NASA ARC-Dryden Flight Research Facility. The luminescent pressure sensor is based on a surface coating which, when illuminated with ultraviolet light, emits visible light with an intensity dependent on the local air pressure on the surface. This technique makes it possible to obtain pressure data over the entire surface of an aircraft, as opposed to conventional instrumentation, which can only make measurements at pre-selected points. The objective of the flight tests was to evaluate the effectiveness and practicality of a luminescent pressure sensor in the actual flight

environment. A luminescent pressure sensor was installed on a fin, the Flight Test Fixture (FTF), that is attached to the underside of an F-104 aircraft. The response of one particular surface coating was evaluated at low supersonic Mach numbers (M = 1.0-1.6) in order to provide an initial estimate of the sensor's capabilities. This memo describes the test approach, the techniques used, and the pressure sensor's behavior under flight conditions. A direct comparison between data provided by the luminescent pressure sensor and that produced by conventional pressure instrumentation shows that the luminescent sensor can provide quantitative data under flight conditions. However, the test results also show that the sensor has a number of limitations which must be addressed if this technique is to prove useful in the flight environment. Mclachlan, B. G. and Bell, J. H. and Espina, J. and Gallery, J. and Gouterman, M. and Demandante, C. G. N. and Bjarke, L. Ames Research Center RTOP 537-03-23... Accurate measurement of the static and dynamic earth pressures acting on structures is critical to understanding the behavior of and the interaction between structures and soil. Different types of devices are commercially available to measure the soil-structure contact stress, and the advantages and limitations of some commonly used devices are summarized. A new, easily constructible, simple, and robust sensor assembly for measuring pressures at the soil-structure interface is introduced and discussed. The sensors are suitable for a variety of potential soil-structure contact situations, including static and dynamic load cases and linear and nonlinear soil behavior. One static and two dynamic experimental case studies serve as examples to describe the construction, installation, and deployment of the new sensors. The static and dynamic calibration procedure of pressure sensors with capacities of 144 kPa and 288 kPa are described. Recommendations for investigators to build and implement the sensor for individualized research applications are provided. In the first two chapters of this book there is information about the needs and potential applications of indwelling transducers both present and past, and will go into detail about many topics such as the fundaments of blood pressure transducers, studies of the intestinal motility and clinical aspects of cardiovascular pressure measurements. Chapters 3, 4 & 5 explain and give information on manufacturers considerations of indwelling pressure transducer, specifications of commercial pressure transducers. Research and development of indwelling pressure transducer, explaining the principles of pressure transducer, biomedical applications. And then they move onto future directions for implant pressure transducers and the users point of view. This book covers a wide spectrum on indwelling pressure transducers. Sensors are all around us. They are in phones, cars, planes, trains, robots, mils, lathes, packaging lines, chemical plants, power plants, etc. Modern technology could not exist without sensors. The sensors measure what we need to know and the control system then performs the desired actions. When an engineer builds any machine he or she needs to have basic understanding about sensors. Correct sensors need to be selected for the design right from the start. The designer needs to think about the ranges, required accuracy, sensor cost, wiring, correct installation and placement etc. Without the basic knowledge of sensors fundamental no machine can be built successfully today. The objective of this book is to provide the basic knowledge to electrical and mechanical engineers, engineering

students and hobbyist from the field of sensors to help them with the selection of “proper” sensors for their designs. No background knowledge in electrical engineering is required, all the necessary basics are provided. The book explains how a sensor works, in what ranges it can be used, with what accuracy etc. It also provides examples of industrial application for selected sensors. The book covers all the major variables in mechanical engineering such as temperature, force, torque, pressure, humidity, position, speed, acceleration etc. The approach is always as follows: - Explain how the sensor works, what is the principle - Explain in what ranges and with what accuracy it can work - Describe its properties with charts, eventually equations - Give examples of such sensors including application examples Some years ago, silicon-based mechanical sensors, like pressure sensors, accelerometers and gyroscopes, started their successful advance. Every year, hundreds of millions of these devices are sold, mainly for medical and automotive applications. The airbag sensor on which research already started several decades ago at Stanford University can be found in every new car and has saved already numerous lives. Pressure sensors are also used in modern electronic blood pressure equipment. Many other mechanical sensors, mostly invisible to the public, perform useful functions in countless industrial and consumer products. The underlying physics and technology of silicon-based mechanical sensors is rather complex and is treated in numerous publications scattered throughout the literature. Therefore, a clear need existed for a handbook that thoroughly and systematically reviews the present basic knowledge on these devices. After a short introduction, Professor Bao discusses the main issues relevant to silicon-based mechanical sensors. First a thorough treatment of stress and strain in diaphragms and beams is presented. Next, vibration of mechanical structures is illuminated, followed by a chapter on air damping. These basic chapters are then succeeded by chapters in which capacitive and piezoresistive sensing techniques are amply discussed. The book concludes with chapters on commercially available pressure sensors, accelerometers and resonant sensors in which the above principles are applied. Everybody, involved in designing silicon-based mechanical sensors, will find a wealth of useful information in the book, assisting the designer in obtaining highly optimized devices. The Second International Conference on Press-in Engineering (ICPE) 2021 was organized by the International Press-in Association (IPA). The conference is held every three years and the main theme this time is "Evolution and Social Contribution of Press-in Engineering for Infrastructure Development, and Disaster Prevention and Mitigation". These proceedings contain 2 keynote lectures, 3 state-of-the-art lectures and about 60 papers from more than 10 countries. This publication provides good practice guidance on the application of the press-in piling method, to satisfy the requirements of geo-structures which are embedded utilizing prefabricated piles. It covers actual examples of the press-in piling method applied to various geo-structures, such as temporary and permanent retaining walls, cofferdams, cut-off walls, foundation piles etc. The content addresses the technical and construction issues relating to the selection of the appropriate type of press-in piling method, in accordance with required structural design criteria and soil and working conditions. The aim of this publication is to concisely describe practical

uses of the press-in piling method for project owners, designers, contractors, academic researchers and other people in the construction industry. The project aims to develop a system to indicate leaks occurring in a Positive Airway Pressure (PAP) machine which sends a passage of air to the patients suffering from sleep apnea, through a hose and a nose mask. The system uses programming software to record and analyse the data obtained from the sensors and provides an interface for the user to select a method for notifying the time instant and location of leak occurrences.The system used an approach of using sensors for leak detection. Two pressure sensors and two audio sensors were selected out of which, one pressure sensor and audio sensor was installed on the mask side and the other pressure sensor and audio sensor was installed on the machine side. To install the sensors a connector was used for each side. The sensors were placed inside the connector. After the installation of the sensors, the signals from the sensors are acquired using a Data Acquisition device to read the analog signals and send it to the computer. A programming software was used to acquire the signals transmitted from the data acquisition device and perform necessary operations to analyse the data and detect leaks. The output of the sensors was too low for connecting with a data acquisition device, therefore circuits were designed to amplify the sensor signals. LabJack was chosen as a data acquisition device and LabVIEW software was used to acquire and analyse the signals transmitted by LabJack. Before analysing the signals, they were pre-processed for noise reduction and signal conditioning. The root mean square of the signal was found and used for analysis. The output voltages of the pressure sensor were converted to range of 4-20 as the pressure range of the PAP machine is 4-20 cm of water. Also, as the amplitude of the audio sensor did not change much for leaks, the area under the curve was found and used for leak detection. The leaks are classified based on the location as Mask and Machine leaks.The algorithm was only able to detect leaks of certain pressure ranges and it was not able to detect leaks of higher pressure range. Then the system was updated by replacing the sensors with an amplified and more sensitive one. The algorithm was also improvised by setting thresholds for each pressure range which increased the accuracy to 75%. The system was not still able to detect very fine leaks that occurs on the mask side. Therefore, the system was again updated with new programmable Microcontroller called Arduino and a new programming software called MATLAB. The Arduino was programmed to transmit the signals using serial port communication. A Moving Average filter with window size 500 was designed to reduce the noises in the system and the filtered signal values were again filtered to obtain a distinct signal for each set pressure with no leaks and for all intensities of leaks. The algorithm, instead of using the pressure sensor values separately, used the difference between the machine side and mask side pressure sensor values for detecting the leaks. The audio sensor on the mask side was eliminated and the audio sensor that was previously installed inside the connector was moved to outside for better response. An accuracy of 100 % was achieved in Laboratory testing. A Graphical User Interface was designed to start and stop the software and choose the notification method. Two notification methods were designed namely text message and alarm. Based on the user's choice the corresponding notification method will be used to notify the user if the leak sustains

longer than the period mentioned by the clinician. This book constitutes the refereed proceedings of the 9th International Conference on Pervasive Computing, Pervasive 2011, held in San Francisco, USA, in June 2011. The 19 revised full papers and three short papers presented were carefully reviewed and selected from 93 submissions. The contributions are grouped into the following topical sections: practices with smartphones; sensing at home, sensing at work; predicting the future; location sensing; augmenting mobile phone use; pervasive computing in the public arena; public displays; hands on with sensing; sensing on the body. MEMS Pressure Sensors: Fabrication and Process Optimization - describs the step by step fabrication process sequence along with flow chart for fabrication of micro pressure sensors taking into account various aspects of fabrication and designing of the pressure sensors as well as fabrication process optimization. A complete experimental detail before and after each step of fabrication of the sensor has also been discussed. This leads to the uniqueness of the book. MEMS Pressure Sensors: Fabrication and Process Optimization will greatly benefit undergraduate and postgraduate students of MEMS and NEMS courses. Process engineers and technologists in the microelectronics industry including MEMS-based sensors manufacturers. A high speed, durable, ion probe based pressure sensor is being investigated for use in pulse detonation engines. Traditional pressure sensors are ill suited for the high temperature and vibratory environment encountered in such engines. An alternative transient pressure sensing method is investigated for pressures behind a hydrocarbon flame. These flames generate ions that are quenched by collisions as a function of pressure. An experiment was devised to correlate the ion decay rate with the pressure using an ion probe well suited for the flow. A correlation has been established showing the ion decay rate is a function of pressure. Additional investigation is required even though the ion probe remains a viable alternative method for measuring pressure. For two locations within the surf zone sea surface elevations were observed using a wave staff and a pressure sensor while simultaneously the two horizontal orthogonal components, u and v, of water particle velocity were measured. Surface elevations derived from pressure sensors are lower, mainly in the region of the crest, compared with the same surface elevations measured with wave gages. Pressure records are more smoothed than wave gage records, and the energy computed for waves measured with a pressure sensor is consistently smaller than for waves measured with a wave gage. Methods for converting pressure to surface elevation are given which include the non-linear velocity term (u sq + v sq) which is usually neglected in the Bernoulli equation. Two techniques are proposed to include this term: (1) flowmeters are used to measure u and v, and (2) the Bernoulli term is derived by determining the velocities by convolving the pressure records using a weighting function determined from shallow water theory. This document is one of a series of IBM® Redbooks® written specifically for the IBM Blue Gene/Q® system. The Blue Gene/Q system is the third generation of massively parallel supercomputers from IBM in the Blue Gene® series. This document explains how to install the Blue Gene/Q rack and the Blue Gene/Q I/O enclosure. It shows you how to remove and replace parts. Polycrystalline SiGe has emerged as a promising MEMS (Microelectromechanical Systems) structural material since it provides the desired mechanical properties at

lower temperatures compared to poly-Si, allowing the direct post-processing on top of CMOS. This CMOS-MEMS monolithic integration can lead to more compact MEMS with improved performance. The potential of poly-SiGe for MEMS above-aluminum-backend CMOS integration has already been demonstrated. However, aggressive interconnect scaling has led to the replacement of the traditional aluminum metallization by copper (Cu) metallization, due to its lower resistivity and improved reliability. Poly-SiGe for MEMS-above-CMOS sensors demonstrates the compatibility of poly-SiGe with post-processing above the advanced CMOS technology nodes through the successful fabrication of an integrated poly-SiGe piezoresistive pressure sensor, directly fabricated above 0.13 μm Cu-backend CMOS. Furthermore, this book presents the first detailed investigation on the influence of deposition conditions, germanium content and doping concentration on the electrical and piezoresistive properties of boron-doped poly-SiGe. The development of a CMOS-compatible process flow, with special attention to the sealing method, is also described. Piezoresistive pressure sensors with different areas and piezoresistor designs were fabricated and tested. Together with the piezoresistive pressure sensors, also functional capacitive pressure sensors were successfully fabricated on the same wafer, proving the versatility of poly-SiGe for MEMS sensor applications. Finally, a detailed analysis of the MEMS processing impact on the underlying CMOS circuit is also presented. Techniques and devices for level, pressure, and density measurement for various process conditions and measurement demands are covered in this comprehensive guide for technicians and engineers. The book includes a new chapter covering equipment selection, mounting techniques, and specifications. This dissertation explores the development of a new stainless steel pressure sensor capable of sustaining harsh environments, including high pressures, high temperatures, and/or corrosive media. The proposed pressure sensor utilizes commercial off-the-shelf (COTS) components, adapts vacuum coupling radiation (VCR) tube fitting (Swagelok Co.) for sensor packaging, and combines micro- and conventional-machining techniques for sensor realization. Capacitive transduction is used to simplify the implementation, as well as take advantage of the high stability and low temperature drift associated with this transduction scheme. Two generations of stainless steel capacitive pressure sensors have been developed in this dissertation. The first-generation sensor is comprised of a stainless steel diaphragm die and a stainless steel backing plate, each electrically isolated with tetraethylorthosilicate (TEOS) silicon dioxide, and packaged by a set of COTS VCR tube fitting. The pressure sensor responses show four operating regions, including stabilizing, non-touch, transition, and touch mode regions. The fully packaged pressure sensor is characterized at high pressures of up to 10,340 kPa (1,500 psi) and at high temperatures of up to 300°C. Corrosive pressure media, including potassium hydroxide (KOH) and tetramethylammonium hydroxide (TMAH) solutions, are used to demonstrate the corrosive-media compatibility of the pressure sensor. After soaking in these corrosive media and several tens of pressure cycles over a month, the fully packaged pressure sensor continues to show stable and consistent operation. Because of the anomalous stabilizing region in these sensors, sensor-to-sensor variance is very poor (i.e., 62% in full-scale (FS)). The second-generation sensor is developed to address the

shortcomings found in the first-generation pressure sensor. A hard tungsten carbide backing plate used to replace the stainless steel backing plate and a stainless steel press plate are used to eliminate the stabilizing region found in the first-generation sensor. Three typical operating regions, including non-touch mode, transition, and touch mode regions, are achieved in the sensor operation. Without the stabilizing region, the sensor-to-sensor variance is improved to 9% FS. The fully-packaged pressure sensor is operated in high pressures of up to 6,900 kPa (1,000 psi), at high temperatures of up to 320°C, and/or in corrosive media, including KOH and sodium chloride (NaCl) solutions. In addition, the pressure sensor is operated 1+ million pressure cycles in the pressure range of 0-4,830 kPa (0-700 psi) at room temperature to demonstrate its lifetime and reliability. In addition, the relationship of deposition conditions and properties of the TEOS silicon dioxide film is investigated using analysis of variance (ANOVA). The chemical composition of TEOS oxide is investigated using X-ray photoelectron spectroscopy and etch rate experiments. Finally, metal-insulator-metal test structures are fabricated to characterize the dielectric properties of TEOS oxide film at elevated temperatures. This report provides key results from a six-month research and development study to establish the state of the art in fiber optic pressure sensing in nuclear power plants and to describe the design and principle of operation of various fiber optic pressure sensors. The authors review current research on fiber optic sensing technologies, compare fiber optic pressure sensors with conventional pressure sensors, discuss the advantages and disadvantages of fiber optic pressure sensors, review the failure modes of these sensors, and survey fiber optic sensor manufacturers. They conclude that while fiber optic sensors are typically more expensive and harder to source than conventional sensors, they offer a range of advantages including EMI/RFI immunity, better accuracy, and faster dynamic response. Sensor fundamentals -- Application considerations -- Measurement issues and criteria -- Sensor signal conditioning -- Acceleration, shock and vibration sensors -- Biosensors -- Chemical sensors -- Capacitive and inductive displacement sensors -- Electromagnetism in sensing -- Flow and level sensors -- Force, load and weight sensors -- Humidity sensors -- Machinery vibration monitoring sensors -- Optical and radiation sensors -- Position and motion sensors -- Pressure sensors -- Sensors for mechanical shock -- Test and measurement microphones -- Strain gages -- Temperature sensors -- Nanotechnology-enabled sensors -- Wireless sensor networks: principles and applications. This practical handbook provides the knowledge needed to specify and apply the best piezoresistive pressure sensors to interface with microprocessors and computers. Eliminating the details of semiconductor physics, it clarifies the three kinds of pressure measurement, explains silicon sensor design This new edition describes pressure and temperature sensitive paints (PSP and TSP) in global surface pressure and temperature measurements in aerodynamics and fluid mechanics. The book includes the latest progress in paint formulations, instrumentation, and steady and unsteady aerodynamic measurements in various facilities including low-speed, transonic, supersonic and hypersonic wind tunnels. The updated technical aspects of PSP and TSP in the book will be useful for students and researchers in experimental aerodynamics and fluid mechanics.

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