

Title (en)
Assessment of life of duct.

Title (de)
Ermittlung der voraussichtlichen Lebensdauer einer Rohrleitung.

Title (fr)
Estimation de la durée de vie d'une conduite.

Publication
EP 0072105 A2 19830216 (EN)

Application
EP 82303636 A 19820712

Priority
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Abstract (en)
A method and apparatus are provided for assessing the overall lifetime t_r until failure of a duct carrying fluid at elevated temperatures and pressures. Sensors located in the duct which can be a pipe sense the pressure of the fluid and its temperature at a multiplicity of points along the pipe. The sensors emit voltage signals which are multiplexed and converted to pulses of a frequency proportional to voltage at 1. The pulses are counted in a fixed time to determine a value for the pressure and temperature in a microcomputer 1. The microcomputer 1 is programmed to calculate a value of hoop stress σ from the pressure values and the measured value of σ is used to determine the relevant value of the Larson Miller parameter P from values thereof stored as a calibration curve against σ in the microcomputer. The computer then calculates the value of t_r from the equation: $t_r = 10^{(P - C)/C}$ where T is the temperature in DEG K and C is a constant. C can be taken as being equal to 20 and the life fraction $tF(m)$ of the pipe used up between sequential signal samples of the same temperature sensor is determined by the computer from the equation: $tF(m) = (t_1 - t_2)/t_r$ where t_1 is the time of the last or current sample, t_2 is the time of the last but one sample, and t_{r1} is that value of t_r derived from the current temperature signal. The computer 1 integrates $tF(m)$ to determine the overall fraction $SIGMA tF(m)$ of the life of the pipe used up in the period during which the pipe has been carrying fluid. Failure of the pipe is indicated when $SIGMA tF(m) = 1$.

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Cited by
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