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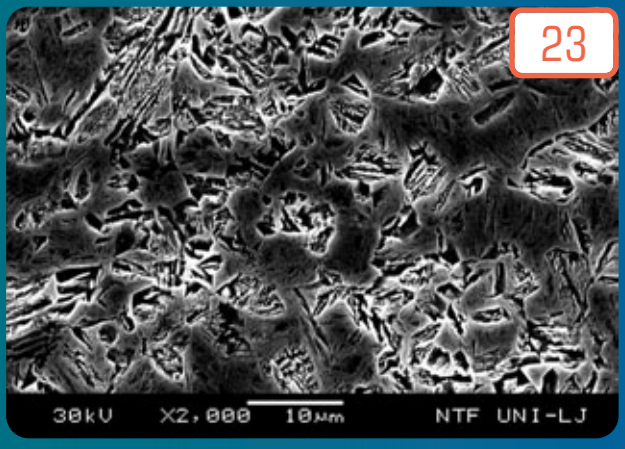
Cover story – continued

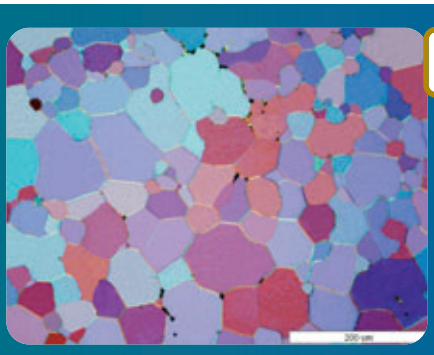
There are several distinct types of platforms and rigs. Fixed platforms are economically feasible for installation in water depths up to about 520 m. They are built on concrete and/or steel legs anchored directly onto the seabed, supporting a deck with space for drilling rigs, production facilities and crew quarters. Such platforms are, by virtue of their immobility, designed for very long term use, as for instance the Hibernia platform. Compliant Towers, consist of narrow, flexible towers and a piled foundation supporting a conventional deck for drilling and production operations, and are typically used in water depths ranging from 450 and 900 m. Semi-submersible Platforms having legs of sufficient buoyancy to cause the structure to float, but of weight sufficient to keep the structure upright, can be moved from place to place, and they are generally anchored by cable anchors during drilling operations, and can be used in depths from 180 to 1,800 m. Jack-up Platforms can be jacked up above the sea, by dint of legs than can be lowered like jacks, and are used in relatively low depths. Drillships, a maritime vessel that has been fitted with drilling apparatus. Tension-leg Platforms, consist of floating rigs tethered to the seabed in a manner that eliminates most vertical movement of the structure, and are used in water depths up to about 2,000 m. The "conventional" Tension-leg Platform is a 4-column design which looks similar to a semisubmersible. Spar Platforms are moored to the seabed with more conventional mooring lines like the Tension-leg Platforms. The "conventional Spar Platforms" have one-piece cylindrical hull, the "truss spar" where the midsection is composed of truss elements connecting the upper buoyant hull (called a hard tank) with the bottom soft tank containing permanent ballast, and the "cell spar" which is built from multiple vertical cylinders.

The building of oil platforms requires many conventional and advanced materials. Taking into consideration the threat connected with the exploitation and crude oil output and gas, and also exceptionally strong work conditions in the sea atmosphere with the danger of storms, typhoon, tsunami, and in the north also the crash with icebergs, platform supporting constructions require the application of highly resistant constructional steels and corrosion-resistant reinforced concrete including the biological ones in the sea conditions. Drilling tools, tubes and containers require the application of specialist materials, including the corrosion-resistant ones. A great number of oil platforms exploited at present allowed for the gathering of very many practical experiences in the field of engineering materials applied for that aim. In the Journal of Achievements in Materials and Manufacturing Engineering, among others papers which are published in that issue sometimes concern that an exceptionally specialist subject matter.

Selected materialographical photo



The Materials section represented by M. Gojic, B. Kosec, I. Anzel, L. Kosec and A. Preloscan on "Hardenability of steels for oil industry" on a **page 23** presents that the chemical composition of low alloy steels for oil industry is usually complex and defined in most cases by standards which give range of concentration of the important alloying elements (Cr, Mo, Mn, etc.) as well as the upper limits of impurity elements (S and P). Alloying elements increase the cost of the steel and from that reason it is important to select only steels which required to ensure compliance with specifications. The economical way of increasing hardenability of steels (at constant carbon content) is to increase the manganese content. It is known that carbon has marked the effect on hardenability of steel, but its use at higher levels is limited because lower toughness and increased probability of distortion and cracking during heat treatment and welding. The addition of manganese at low alloy steels is very useful for improvement of their hardenability. The cooling rate determines the amount of martensite structure. The hardenability test was carried out by the use of Jominy method. During Jominy testing the temperature changes were monitored by means of CrNi-Ni thermocouples which are connected with an eight-channel digital/analogues converter. Microstructure was determined using a scanning electron microscopy (SEM). Originality and high value of this research work based on development and application of a new grade of low alloy Mn-Mo steel for oil country tubular goods.



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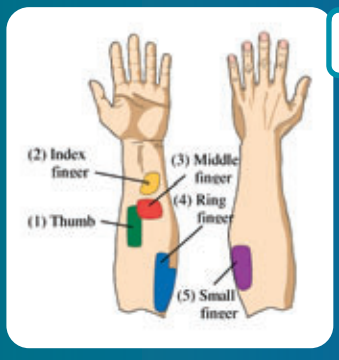
In the paper entitled "The influence of ageing on structure and mechanical properties of WE54 alloy" presented by A. Kiełbus on a **page 27** the relationship between the ageing parameters, microstructure and mechanical properties in WE54 magnesium alloy was specified. WE54 magnesium alloy offers attractive properties for aerospace and automotive industries. It reaches high specific strength, creep resistance and corrosion resistance up to a temperature of 250°. The alloy contains 5%wt.Y, 1.7%wt.Nd and 0.55%wt. Zr. The strength of this alloy is achieved essentially via precipitation strengthening. Depending on the ageing temperature and time, the precipitation sequence in WE alloys has been reported to involve formation of phases designated β", β' and β. The aim of the research was to determine the effect of ageing parameters on the microstructure and mechanical properties of WE54 magnesium alloy. The microstructure of the WE54 alloy in as-cast condition consists of alpha-Mg phase matrix with some fine-dispersion precipitates of Mg2Y and Mg24Y5 intermetallic phases inside and on grain boundaries. After solution treatment followed by water-cooling, the intermetallic phases dissolve in the matrix. The ageing treatment caused precipitation of β", β' and β1 intermetallic phases. The best mechanical properties (Rm=333MPa, R0.2=257MPa, A5=6,3%) has alloy with β' intermetallic phase after ageing at 250°C/16h. The established heat treatment parameters can be useful for preparing heat treatment technology of WE54 casts.



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The research paper entitled "Finger curvature movement recognition interface technique using SEMG signals" by Y. Itoh, H. Uematsu, F. Nogata and T. Nemoto on a **page 43** says that the amount of crookedness of each finger can also be recognised with the help of surface EMG. It could be used as a machine interface technology in the field of welfare equipments, robot hand operation, virtual reality, etc. Until recently, keyboard has been used as the primary input method for a machinery operation system. But in recent years, numerous methods related to direct input interface have been developed. One of them is to measure the surface electric potential that generates on the skin surface during muscle contraction. Based on this fact, a hand finger operation can also be recognised with the help of the surface muscle electric potential. The purpose of this study is to identify the hand finger operation using surface electromyogram (SEMG) during crookedness state of the finger. In this experimental study, the electric current generated on the skin during muscle activity was measured for different hand finger operations. As a result, it is found that there is a specified position related to the maximum intensity of EMG signals for each finger. The objective of this research project was to develop the method of recognising the hand finger operation and their crookedness states from surface electromyogram (SEMG).

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