from Tsukuba, Japan to the world

NIMS NOW International

National Institute for Materials Science

Vol.4 No.2 February, 2006

Special Features

The Materials Information Technology Station - Supporting the Creation of a Sustainable Society

Activities of the Materials Information Technology Station

- Aiming at Acquisition of Materials Data and Dissemination of Materials Information which are Used -

Koichi Yagi
Director General
Materials Information Technology Station (MITS)

Because materials are the basis of products and structures, a good understanding of the properties of materials is necessary in order to create safe, reliable products and structures. However, it is not possible to take full advantage of materials in products with only a qualitative understanding of the behavior of materials. If products are to demonstrate the expected performance, the performance values of the material must be utilized in the design of the product. For this reason, it is necessary to communicate these performance values to the designers and manufacturers of products.

For example, high strength materials are necessary for automobile weight reduction. The structural parts used in automobiles are subjected to cyclical loads due to vibration, etc. Therefore, in designing these parts, it is necessary to know the fatigue strength which the material is capable of providing. Similarly, because heat-resistant steel tubes which can withstand high temperature and high pressure steam are used in thermal power plant boilers, the creep-rupture strength at 100,000 hours of high temperature steels is necessary for boiler design.

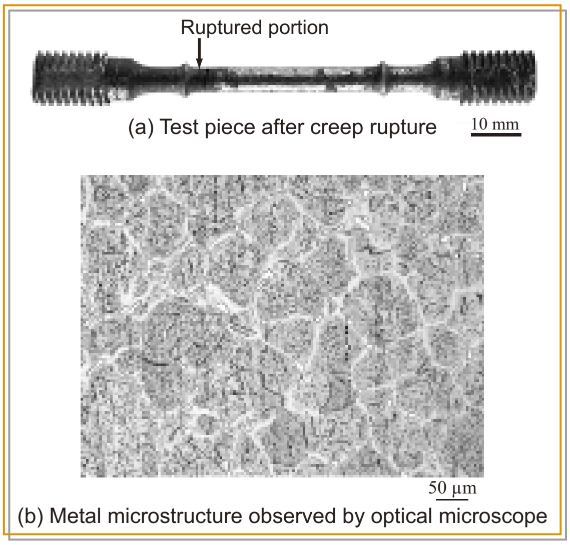


Fig. Long-term creep rupture test specimen of SUS304HTB (18Cr-8Ni) and its metal microstructure (temperature: 700 °C, stress: 29 MPa, time to rupture: 179,368.0 h).

In the design and manufacture of products and structures of these types, quantitative numerical values which can show the machine designer the capacity of the material are necessary. NIMS and its predecessor organization have been conducting creep and fatigue tests of domestically-produced metallic materials for practical applications since 1966 and have published these test data in creep and fatigue datasheets. The **figure** shows (a) a specimen in which creep rupture occurred at approximately 180,000 hours (roughly 21 years) and (b) the metal microstructure of the specimen. In fiscal year 2002, the NIMS Material Information Technology Station (MITS) also began collecting material properties data related to atmospheric corrosion and space use materials strength.

< Continued on p.4

in this issue

NIMS News

Comprehensive Cooperative Research Agreement with the UC Santa Barbara

President Kishi shaking hands with Prof. Yang, Chancellor of UCSB (left), after the signing.

< Continued on p.4

Improvement of Reliability in High Temperature Plants by Long-Term Creep Strength Evaluation

Kazuhiro Kimura
Creep Group
Materials Information
Technology Station (MITS)

In recent years, electric power producers have promoted higher efficiency in thermal power plants, which are one of the principal sources of CO_2, in order to reduce consumption of fossil resources such as petroleum, coal, and natural gas with the aim of reducing CO_2 emissions. Because energy efficiency in power generation can be improved by increasing the steam temperature and pressure in steam turbines, active research and development is being conducted on high temperature steels with excellent high temperature/long-term creep strength, and high efficiency thermal power plants using high strength creep-resistant steels are being constructed and put into operation. When designing high temperature pressure vessel components, the plate thickness and other specifications are calculated referring to the maximum allowable tensile stress, which is generally set based on long-term creep strength over a period of 100,000 hours (approximately 11.4 years). This means that an accurate evaluation of long-term creep strength is essential for securing the safety of high temperature plants.

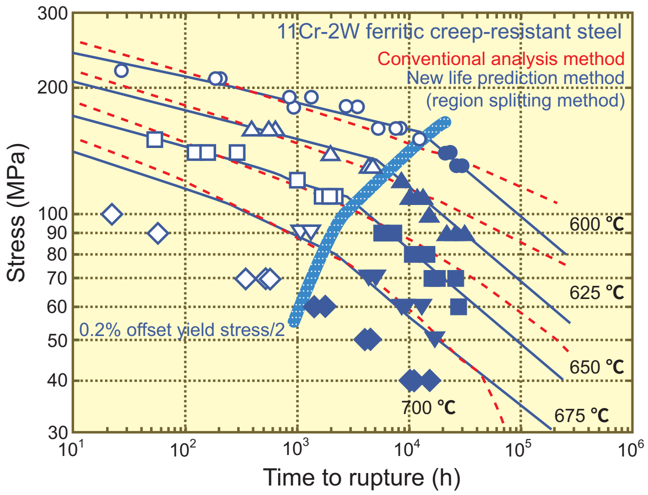


Fig. Comparison of creep strength analysis/prediction results by the conventional analysis method (red) and region splitting (NIMS) method (blue).

To obtain long-term creep test data exceeding 100,000 hours for creep-resistant metallic materials for practical applications, NIMS (including its predecessor organization, the National Research Institute for Metals, Science and Technology Agency) has been engaged in a Creep Datasheet Project since 1966 (as described in *NIMS NOW*, June 2004), and publishes the collected creep test data in creep datasheets which are sent to more than 600 domestic and international corporations, universities, academic societies, and research institutes of various types. These data are also available via the internet in the NIMS Materials Database (http://mits.nims.go.jp/), and are actively used in high temperature material research and development and in maintenance of high temperature plants.

Together with the creation of creep datasheets, the MITS Creep Group also analyzes the collected long-term creep test data and microstructural changes in long-term crept materials, etc. and conducts research on the mechanism by which materials manifest creep strength, material quality degradation behavior, and advanced analysis/evaluation methods for creep strength. As one result of this work, the Creep Group found that there is a danger of overestimating the long-term creep strength of the recently-developed 9-12%Cr ferritic creep-resistant steel if its long-term creep strength is extrapolated from short-term creep test data by the conventional method. Because overestimation of long-term creep strength will result in setting an excessively high maximum allowable tensile stress, which is used as the design standard for high temperature structural components, adequate safety cannot be secured. Therefore, the Creep Group developed and proposed a new analysis method in which creep behavior is partitioned into short-term and long-term stress ranges using 50% of 0.2% offset yield stress as an index (see **figure**). The maximum allowable tensile stress regulated in "Thermal Power Standard Code" established by Ministry of Economy, Trade and Industry (METI) was reviewed based on the results of analysis and evaluation using the new NIMS region splitting method, contributing to improved safety and reliability in high temperature plants.

For more details: http://www.nims.go.jp/creep/creep_e.html

NIMS News

MOU with California NanoSystems Institute

Prof. James Gimzewski, CNSI (right) with Dr. Aono, Director-General, NML.

(December 13, 2005, Tsukuba) -- The Nanomaterials Laboratory (NML) signed an MOU for research cooperation with the California NanoSystems Institute (CNSI). CNSI is a research institute which was established by the University of California, Los Angeles and University of California, Santa Barbara with funding from the state of California and is working to develop new research in connection with nanoscience and nanotechnology. In the future, the two sides will actively promote exchanges of researchers and information, and intend to break ground in novel atomic/molecular devices, develop a nanoscale X-ray spectrometry method, etc. Cooperation in the field of bio-nanotechnology is also envisioned.

Elucidation of Fatigue Strength
- Gigacycle Fatigue Properties -

Koji Yamaguchi
Fatigue Group
Materials Information Technology Station (MITS)

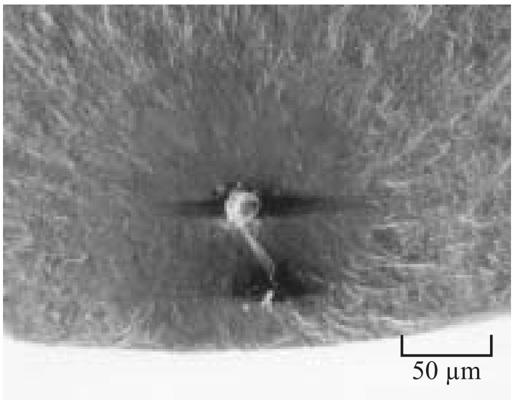


Fig. 1 Typical example of fracture surface in internal fracture (spring steel).

The Fatigue Group publishes datasheets on the gigacycle fatigue properties of metallic materials. Gigacycle fatigue is a phenomenon in which fatigue fracture occurs after an extremely large number of cycles, for example, in the range from 10^8 to 10^{10} cycles. Until now, fatigue strength was decided by at most 10^7 cycles. However, it has become clear that in many metallic materials and steels, including high strength steels, fatigue strength decreases drastically after 10^7 cycles, and furthermore, fractures in this case originate from small internal defects and inclusions in the material (**Fig. 1**).

For this reason, the Fatigue Group has decided to obtain fatigue strength up to 10^{10} cycles for various types of high strength steels and titanium alloys using the ultrasonic fatigue tester (frequency: 20 kHz) shown in **Fig. 2** and to published its results in datasheets. The ultrasonic fatigue tester is a device which enables fatigue testing at a speed more than 200 times faster than with the conventional technique, making it possible to shorten a 10^{10} cycle test, which normally requires 3 years, to only 1 week.

Fig. 2 Ultrasonic fatigue tester (20 kHz).

Figure 3 shows the gigacycle fatigue strength of spring steel. It can be understood that fatigue strength decreases with the number of cycles, and a fatigue limit (phenomenon in which fatigue strength becomes horizontal in **Fig. 3**) does not appear. Furthermore, because the results for 20 kHz (●) are in good agreement with the results for 100 Hz (▼) and 600 Hz (■), these results also demonstrate the appropriateness of the 20 kHz fatigue test. In other words, excluding the one point shown by the attached vertical bar (|), all of the results in **Fig. 3** were internal fracture (**Fig. 1**).

As described above, the significance of these efforts in connection with gigacycle fatigue is not limited merely to arranging data in a reduced period of time by using the 20 kHz test, but also includes the steady, painstaking work of verifying the appropriateness of the data by simultaneously conducting long-term fatigue test using conventional test machines. Our aim is to realize a safe society which is free of material failure accidents due to fatigue fracture by continuous efforts of this type.

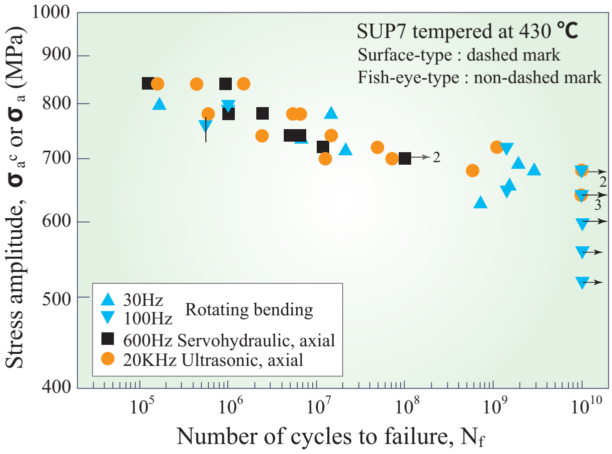


Fig. 3 Gigacycle fatigue strength of spring steel (SUP7) tempered at 430 °C.

For more details: http://www.nims.go.jp/mits/fatigue/index_e.html

NIMS News

Publication of "Materials Science Outlook 2005"

Front cover

(February, NIMS) -- NIMS recently launched the English edition of "Materials Science Outlook", which analyzes general trends related to materials research in Japan and other countries, including governmental polices and measures, research activities, and other matters of interest. While carrying out its own research activities, NIMS also plays a role as a core institute supporting materials research activities, not only in Japan but in the world as a whole. The annual publication of "Materials Science Outlook" is one part of this. NIMS plans to distribute this booklet to public policymakers, managers of research institutes, and others involved in materials research both inside and outside of Japan. The contents can be downloaded from the NIMS official website: http://www.nims.go.jp/

NIMS Materials Database
- Construction of a User-Friendly Database -

Masayoshi Yamazaki
Materials Database Group
Materials Information Technology Station (MITS)

Since April 2003, NIMS has made 11 databases on materials available via the internet (http://mits.nims.go.jp), ranging from a DB on the crystallographic structure of substances to DBs on the creep and fatigue strength properties of practical materials. These databases can be utilized effectively not only in materials development, selection of the optimum use for specific materials, and selection of the optimum materials for specific uses, but also in prediction of material properties, comparison of material properties, and identification of materials (dictionary function). However, due to differences in the timing of the development of the respective DB and the persons in charge of development, it cannot necessarily be said that this is an easy-to-use system for users. Recognizing this, we have made several improvements with the aim of creating a user-friendly system. First, we consolidated the user registration process into a single system and improved transmission security by introducing SSL (secure socket layer) to meet the requirements of Japan's Act on the Protection of Personal Information (2005). The consolidated registration system makes it possible to access all 11 DB using the same ID and password. At present, approximately 20,000 persons (including approximately 5,000 non-Japanese) from 6,800 institutions in 74 countries have registered, and each month about 2,000 persons use the DB, logging in an average of 3-4 times.

Fig. Example of search results using the horizontal search system MatNavi. (http://mits.nims.go.jp/matnavi/)

To enable users to locate the DB which contains the material information they require, we developed a horizontal search system called MatNavi (http://mits.nims.go.jp/matnavi/). This system allows the user to make a horizontal search of 8 DBs by material or by property, using categories and keywords. The **figure** shows an example of a search using the category Property. It can be understood that the system contains around 215,566 property data. A system which provides the results of searches with MatNavi to the U.K.'s Materials Database Network (http://matdata.net/index.jsp) was also developed. Using matdata.net, it is possible to execute a simultaneous horizontal search of data combining the materials databases at leading research institutes throughout the world.

The Polymer Database (PolyInfo) contains approximately 15,000 registered polymers. However, this does not mean that all of the physical properties of these polymers are contained in the PolyInfo DB. We therefore developed a physical property estimation system using the atomic group contribution method and made this system available beginning in February 2005. Physical property estimation results for already-registered polymers are provided in a form which enables comparison with experimental data in the literature whenever possible. At present, estimation of 10 classes of 5 physical properties is possible, and this will be progressively expanded to include other properties in the future.

Although data reliability is the most important consideration in a database, users will not utilize a difficult system. We will continue to improve the NIMS Materials Database, reflecting the opinions of users, and welcome any comments and suggestions you may have. Please feel free to contact us at: mits@ayamegusa.nims.go.jp

For more details: http://mits.nims.go.jp/mdg/Staff_eng.html

Special Features

< Continued from p.1

Activities of the Materials Information Technology Station

For effective utilization of data, it is important to understand the mechanism of the behavior of the material, which forms the basis of the performance data. Therefore, in addition to data collection activities, MITS also conducts research related to the evaluation of material strength properties, estimation of useful life, and elucidation of the mechanism responsible for the manifestation of strength properties, etc., and thus is endeavoring to expand and accumulate knowledge as well as acquire data.

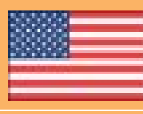
To enable the largest possible number of users around the world to take advantage of this data and knowledge on material properties, the NIMS Materials Database (http://mits.nims.go.jp/), which comprises a total of 11 individual databases, was made available on the internet beginning in April 2003. The Structural Materials Database is one of these databases. In these database activities, we are also actively promoting links with other important databases worldwide as part of our efforts to provide even more effective data and knowledge for users.

For more details: http://www.nims.go.jp/mits/english/E_index.htm

< Continued from p.1

NIMS News

Comprehensive Cooperative Research Agreement with the UC Santa Barbara



(January 4, Santa Barbara) -- NIMS concluded an agreement on comprehensive research cooperation with the University of California, Santa Barbara (UCSB). UCSB consistently ranks in the Top 3 among all American universities in the materials science division. Although NIMS and its America counterpart are already working to create a network and train young scientists based on an MOU which the NIMS International Center for Young Scientists (ICYS) concluded with UCSB's International Center for Materials Research (ICMR) in June of last year, both sides judged that it is necessary to create an even stronger relationship through cooperation between the two institutes in a wide range of materials research fields, and reached a mutual understanding by concluding this comprehensive agreement.

Elucidation of the Mechanism of Initiation and Propagation of Crevice Corrosion

Yuichi Fukaya, Tadashi Shinohara
Corrosion Group
Materials Information
Technology Station (MITS)

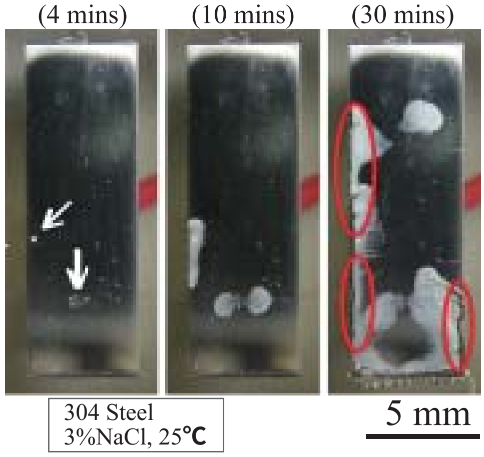


Fig. 1 Condition of initiation and propagation of crevice corrosion. A black-colored corrosion product formed in the red ellipse at 30 min.

Stainless steel is a representative corrosion-resistant metallic material. However, in some cases, a type of corrosion damage called crevice corrosion occurs when stainless steel is exposed to an aqueous solution containing NaCl or other chlorides. Because this corrosion modality occurs even in environments with low chloride concentrations and becomes the initiation site for stress corrosion cracking (SCC), it has become a serious problem in actual equipment and structures. On the other hand, due to the extremely limited space in the crevice, until now, few researches have focused on solution chemistry inside crevices. Therefore, we attempted to elucidate the mechanism of the process from initiation to propagation of crevice corrosion by real-time observation of crevice corrosion in a crevice formed by pressing stainless steel against optical glass using various observation methods.

Fig. 1 and **Fig. 2** (left) are examples of observation of crevice corrosion in Type 304 stainless steel (18Cr-8Ni steel). Initially, spotty dissolution was noted at the positions indicated by the arrows. This was followed by expansion of the dissolved parts to the vicinity of the crevice mouth (represented here by the edge of the steel specimen). The dissolved area then developed along the crevice, as though encircling the crevice and a black-colored corrosion product formed in the vicinity of the crevice mouth (red ellipse at 30 min in **Fig. 1**). According to SEM observation (**Fig. 2**, right), it was found that crevice corrosion did not necessarily propagate deeply into the material at the initiation site, indicating that the respective mechanisms differed in initiation and propagation.

Fig. 3 shows the results of observation of the change in pH in the crevice when pH indicator paper was inserted between the Type 304 stainless steel and the optical glass used for observation. Initially (0 min), the pH in the crevice was 5-6 (green), but a process in which the low pH area (3-4 or lower; yellow-to-orange) expanded with time could be observed. Thus, as shown in **Fig. 1** and **2**, crevice corrosion initiates in the vicinity of the crevice mouth, and the pH in this area begins to decrease immediately after the start of the test. Although pH also decreased in parts where crevice corrosion did not occur, this test confirmed that there are cases where the pH was higher than that at which Type 304 stainless steel no longer has corrosion resistance (depassivation pH in the case of Type 304 stainless steel is 2.0).

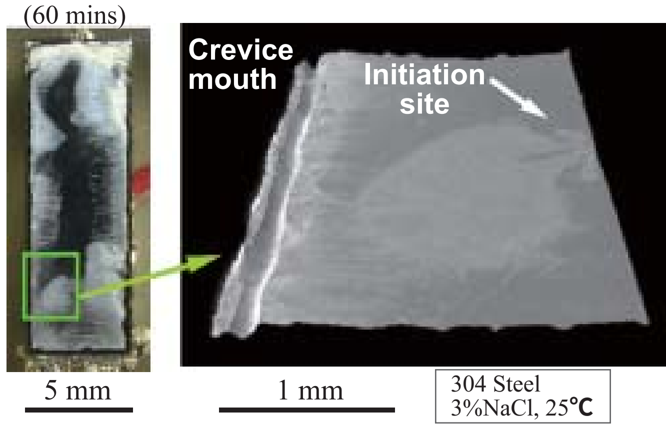


Fig. 2 Results of SEM observation of the crevice corrosion area (part enclosed by green line on left side of the figure).

In addition to analyzing these observation results, the Corrosion Group is also attempting to elucidate the initiation mechanism and propagation mechanism of crevice corrosion by applying a numerical model.

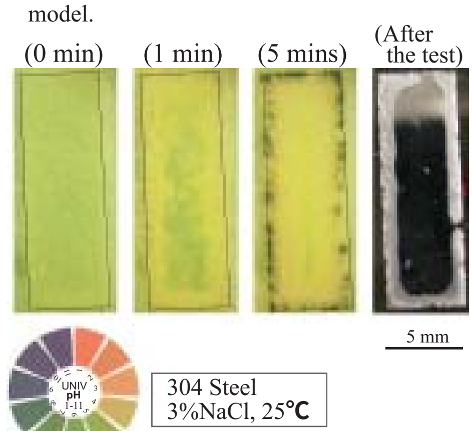
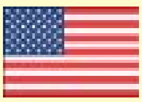


Fig. 3 Example of observation of pH change during initiation/propagation of crevice corrosion. The black area at 5 min is the color of the corrosion product.

For more details:
http://www.nims.go.jp/corrosion/index_e.html

NIMS News



Joint Workshop with the University of North Carolina

Participants in the joint workshop.

(December 20, 2005, Tsukuba) -- NIMS held a joint workshop on nanoscale materials with the University of North Carolina at Chapel Hill (UNC-CH). UNC-CH is the central institute in research on nanoscale materials in the state of North Carolina and is already engaged in joint research on nanomaterials with NIMS. The objectives of this workshop were to mutually introduce a wide range of research activities at NIMS and UNC-CH and to promote further development of cooperation in exchanges of human resources, joint research, and other activities. Talks were given by 6 UNC-CH faculty members and 9 members of NIMS, and spirited discussions covered a diverse range of fields relating to synthesis, evaluation, theory, applications, and other aspects of nanoscale materials research.

Cryogenic Materials Supporting Advanced Technology

Toshio Ogata
Cryogenic Materials Group
Materials Information Technology Station (MITS)

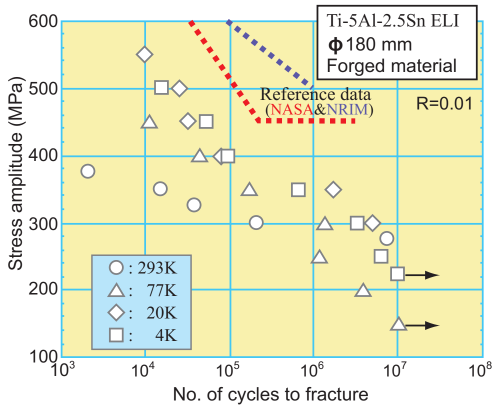


Fig. 1 Fatigue properties of titanium alloy at various temperatures and conventional reference properties.

In order to design equipment and improve its reliability, it goes without saying that an adequate grasp of the properties of the material to be used under practical conditions is important. However, in advanced fields of technology, there are cases where design work is carried out referring to examples of use in other countries or to similar data. As the reasons for this, adequate data may not be available due to the short history of the materials to be used, evaluation of material properties in the use environment may be difficult, or evaluation methods may have not been established.

One such example is the cryogenic properties of engine-related materials for Japanese launch vehicle, which are used at the temperature of liquid hydrogen (-253℃). Because material testing would be difficult and costly in Japan, in many cases, engines have been designed referring mainly to data on properties in liquid H_2 published by NASA and other foreign organizations or to similar data for liquid helium reported in Japan. This was pointed out in the analysis of the accident involving the No. 8 H-II rocket. Therefore, as one measure for improving the reliability of space rockets, NIMS has been conducting mechanical tests for the materi-

Creep Crack Growth in High Temperature Structural Components

Masaaki Tabuchi
High Temperature Materials Group
Materials Information Technology Station (MITS)

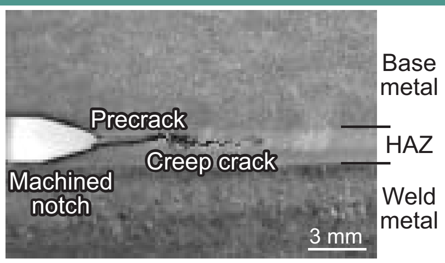


Fig. 1 Results of creep crack growth test using CT specimen of welded joint (growth of Type IV crack).

Structural components which are used at high temperature environments for extended periods (such as boilers and turbines used in power generation) undergo progressive deformation with passing of operating time, accompanied by initiation and growth of cracks which may eventually lead to failure. This phenomenon is referred to as creep crack growth. Prediction of the initiation time and growth rate of creep cracks, and appropriate repair or replacement of components, is extremely important from the viewpoint of safety and reliability of equipment.

International collaborative research for standardization of methods of monitoring creep crack growth and predicting fracture life has been carried out as one topic of the Versailles Project on Advanced Materials and Standards (VAMAS) activities, and the ASTM E-1457-00 standard, "Standard Test Method for Measurement of Creep Crack Growth Rates in Metals" was produced based on the results of international round robin tests of various heat resisting alloys. Likewise, with ductile heat resisting steels, there are cases where brittle creep fracture occurs due to the effect of multi-axial stresses in structural components with thick and complex shapes. Therefore, the international collaborative research on test methods for high temperature fracture properties using various kinds of specimens (circumferential notched bar, internal pressurized pipe, etc.) simulating structural components was carried out over the past 5 years. This test method is now being summarized in a TTA (technical transfer assessment) document with the aim of standardization in the ISO.

Recently some examples where creep voids and cracks were detected in welds of ferritic heat resisting steels which are used at high temperature conditions for extended periods in thermal power plants have been reported. Creep cracks which occur in the heat affected zone (HAZ) of welds are referred to as a Type IV crack (**Fig. 1**) and have become an important research topic because there are cases where they result in leaks of high temperature, high pressure steam. Therefore, a new VAMAS technical working area (TWA31) was set up last year to conduct international collaborative research on the initiation and growth of voids and cracks in welds.

We have been participating, centering on VAMAS activities in the field of high temperature fracture, and have clarified the effect of multi-axial stress on the initiation/growth of creep cracks by conducting systematic research on the effects of the specimen shape/dimensions. Publication of data acquired over an extended period of time (such as high temperature fracture properties of welds) in the form of datasheets and databases is planned.

On the other hand, we recently found that it is possible to improve the creep strength of the HAZ in high Cr steels and minimize life reduction due to Type IV cracks by adopting a design with appropriate B, low N composition (**Fig. 2**). In the future, we intend to conduct various kinds of researches on high temperature fractures based on the progress described above.

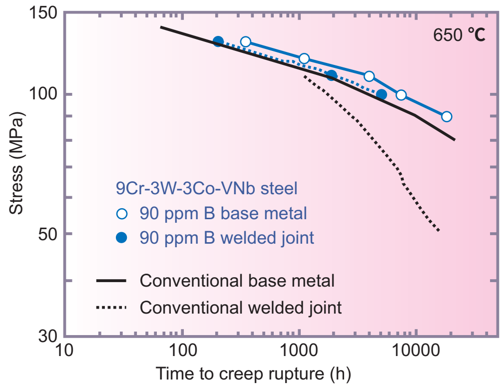


Fig. 2 Suppression of Type IV crack by B addition.

For more details: http://www.nims.go.jp/mits/HTMG/index_e.html als which are practically used in special environments and published the results in datasheets.

Figure 1 shows the fatigue properties of the Ti-5%Al-2.5%Sn ELI alloy which is used in launch vehicle engines at various temperatures, together with the conventional reference properties. The dotted lines in the **figure** show the guideline values of the fatigue life data of sheet materials 2.5 mm in thickness (NASA) at 20 K and forged square billet (NRIM) at 4 K. A comparison of these data shows that the fatigue properties of the materials obtained in this research are approximately 30% lower, at around 10^6 cycles, and thus supports the view that failure of the H-II No. 8 rocket occurred due to the stress level, as argued in the stress analysis in the investigation of the accident. The conventional materials are either sheet materials or forged materials with a large degree of processing. In contrast, with these materials, the finished shape was large and the forging ratio was comparatively small, and the grain size was also large, at approximately 80 μm In the fracture surface at 4 K in **Fig. 2**, there are facets which show a flat plane corresponding to a coarse **α** grain size at the point of origin of fatigue initiation. Based on this, the main factor of the lower fatigue properties of this material than the data reported in the past is considered to be closely related to the fact that strength differs when the material production method is changed, and internal fracture occurred accompanying the formation of facets corresponding to a coarse **α** grain size inside the specimen. This is also supported by the results of an evaluation of the influence of the notch on fatigue strength. Moreover, as a similar decrease in fatigue properties is also found in other materials with large grain sizes and in high temperature fatigue, NIMS is arranging property data and endeavoring to clarify the mechanism of fatigue properties in order to further improve reliability.

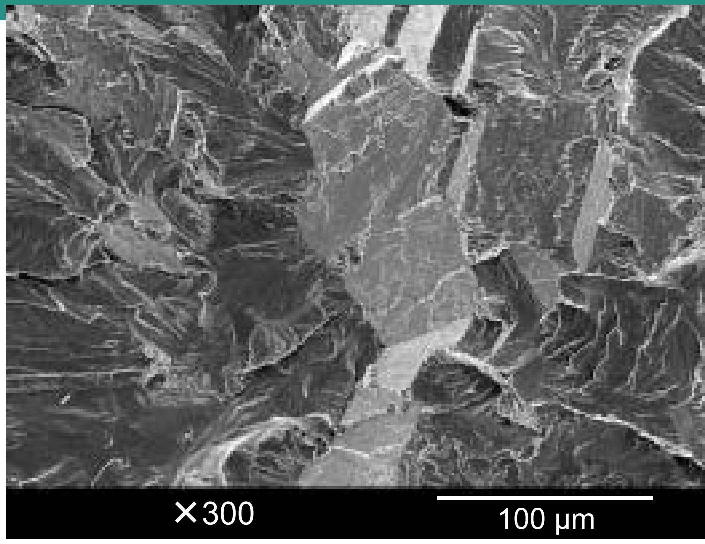


Fig. 2 Fatigue fracture surface of titanium alloy at 4 K.

For more details: http://www.nims.go.jp/cmg/e/

Special Features

The Materials Information Technology Station - Supporting the Creation of a Sustainable Society

Elucidation of Fatigue Strength

- Fatigue Properties of Welded Joints -

Koji Yamaguchi
Fatigue Group
Materials Information
Technology Station (MITS)

Structures such as bridges, high-rise buildings, roadways, and ships are created by welding various materials. Therefore, in addition to the inherent strength of the material, it is also necessary to grasp the strength and fatigue strength of the welded joints. This is because joint strength, and in particular, fatigue strength, is markedly reduced by two types of phenomena, the residual tensile stress generated in welds during cooling after heat is applied when two pieces of metal are welded, and the stress concentrations caused by the weld configuration and weld reinforcements.

To date, NIMS fatigue datasheets have clarified the fatigue strength of joints welded by a variety of methods. The Fatigue Group is currently carrying out systematic fatigue tests using ribbed cross-shaped joints with varying specimen plate thicknesses, as shown in **Fig. 1** and **Fig. 2**. Based on these tests, we have obtained results like those shown in **Fig. 3** and prepared data which enable a quantitative study of the reduction in welded joint fatigue strength from the viewpoints of both residual stress and the stress concentration factor.

Fig. 2 Fatigue tester.

For more details: http://www.nims.go.jp/mits/fatigue/index_e.html

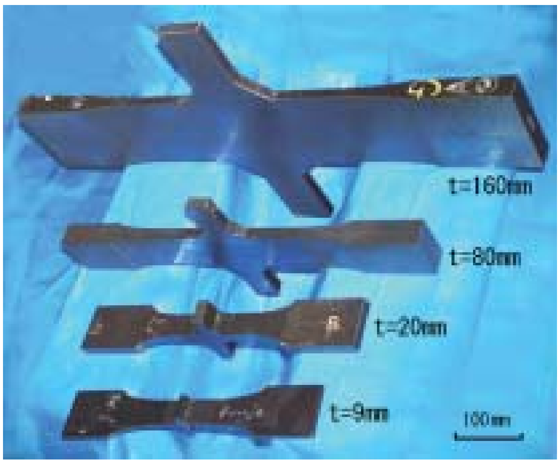


Fig. 1 Ribbed cross-shaped welded joint specimens with different plate thicknesses (t: plate thickness).

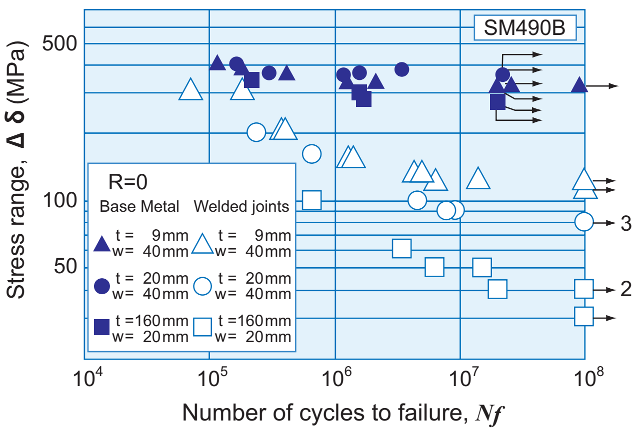


Fig. 3 Results of zero-tension fatigue test (R = 0) of rolled steel for welded structure use (SM490B) (t: plate thickness, W: plate width).

Hello from NIMS

Hello!

My name is Henrik Lindstrom and I come from the northern country of Sweden where I did my Ph.D. at Uppsala University in the field of physical chemistry.

I work at the International Center for Young Scientists (ICYS) in collaboration with my host researcher, Dr. Takayoshi Sasaki. My main research interest lies in solar cells and batteries based on high surface area metal oxide materials.

Besides the challenging and cheerful environment at work, I enjoy meeting people of all nationalities and exchanging views from all over the world in a country like Japan with its rich culture. Tsukuba is an international melting pot where you can experience the Japanese culture mixed with many other cultures. The Japanese culture is very bright, colorful and friendly. I hope you enjoy Japan like I do!

Henrik Lindstrom (Sweden)
ICYS Fellow (February 2005 - February 2007)
International Center for Young Scientists (ICYS)

[On Oarai Bathing Beach (left; my wife, third from left; me)]

[Playing Japanese drum at the Ninomiya House festival (second from left)]

■ Flavour of Japan ■

Konnichiwa!

My name is Břetislav Šmíd. I'm a Ph.D. student from Charles University in one of the most beautiful cities in all of the world, Prague, Czech Republic. I appreciate receiving a chance to visit Japan for one year and do my research at NIMS. I'm glad to work in the Eco-Energy Materials Group with Dr. Mori who, as well as the other members of his group, is always ready to help me with my research and the problems of daily life. I'm interested in bimetallic systems and their use in catalysis for CO oxidation. The field of their applications is very wide, from the automotive industry through filters for cigarettes to fuel cells.

With my girlfriend Natalia, who is from Slovakia, we are very happy to work at the same institute and explore the land of the rising sun together.

Břetislav Šmíd
(Charles University in Prague, Czech Republic)
International Joint Graduate School Program
(September 2005 - August 2006)
Eco-Energy Materials Group, Ecomaterials Center (EMC)

[Dr. Mori's group, first from right, back row]

[With my girlfriend on top of Mt. Mitsutoge]

Japan is a beautiful country, and the people are very kind, which is no wonder considering the fact that so many people live in such a small place. However, we do wonder at what mountains Japan has, as we love mountains and the splendid lookouts from them. So far, we have gone on a few trips to Nikko National Park and Mt. Fuji and the 5 lakes area. With our friends, we spent New Year's Eve in Tokyo and prayed in a shrine for the coming year, so we had a chance to know Japanese culture better. Not only is the culture much different from ours, but the food is as well. It took us a while to take a first bite of typical Japanese specialties like sashimi, shrimp, squid, raw octopus, and shellfish. Now, though, we like it and will remember funny experiences while eating. As well as the food, we also like Japanese drinking, and we've visited a brewery to see how sake is made.

Here, we enjoy everything we don't have at home, including earthquakes and typhoons, and hope to get to know many other amazing places which is Japan rich in.

<Errata Note for Vol.4 No.1 January, 2006 Issue> Page 6 "Atomic Images of Quasicrystal Surface and Step Structure"
The name of NIMS Fellow, Dr. Shoji Yamamoto, should be Dr. Akiji Yamamoto.
*Please refer to our website for the corrected data: http://www.nims.go.jp/eng/news/nimsnow/Vol4/No1/p5.html

NIMS Public Relations Office
National Institute for Materials Science

PUBLISHER
Dr. Masatoshi Nihei

NIMS NOW International is a monthly newsletter made for international readers to introduce our latest research activities and events. Our official website provides you with the back issue download as well as the news on most recent activities at

http://www.nims.go.jp/

To subscribe, contact:
Ms. Naoko Ichihara
Public Relations Office, NIMS
1-2-1 Sengen, Tsukuba, Ibaraki
305-0047 JAPAN
Phone: +81-29-859-2026
Fax: +81-29-859-2017
inquiry@nims.go.jp