The ICATS Scheme for training of industrial coating applicators is gathering momentum such that additional two day Training Courses for those wishing to qualify as ICATS Trainers have been arranged for:

- 13th & 14th July 2009
- 14th & 15th September 2009
- 23rd & 24th November 2009

Additional courses can be arranged depending on demand.

For further information or administrative details, costs and bookings for courses and examinations or detailed information packages free of charge, please contact:

Martin Dawson or David Betts on:
Tel: +44 (0)1709 560459 Fax: +44 (0)1709 557705
Email: enquiries@ruanetpo.com
Internet: http://www.ruanetpo.com

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The President Writes...

Fifty years old! Not me, you realise, but the Institute. (I’m 51, as it happens, although someone asked me the other day when I would be getting my bus pass, and meant it). Those who were able to make it down to the Thames Barrier on the 21st May will know we had an excellent time, courtesy of the Environment Agency and all the others who were kind enough to sponsor the event as listed in the Commemorative Programme. I must also thank David Deacon and the organising committee for making it all happen.

For those who weren’t able to attend, you can get a feel for my keynote presentation by pinning this photo on a distant wall and squinting at it while listening to an AM radio tuned to static. Just like the real thing. Thankfully, I was a relatively minor player in the event and the real stars were our guests from the Forth Road Bridge and Thames Barrier plus our ‘Pipeline Star Council’, fronted by MC Brian Wyatt. Together they demonstrated the incredible contribution ICorr members have made to the development of corrosion control in the UK and beyond.

When you unpin the photo from the wall, you may notice the back cover to the magazine I am clutching. This is the Whit Edition of Science in Parliament, the Journal of the Parliamentary and Scientific Committee, and the cover celebrates the ICorr’s 50th. Within the magazine there is an article, penned jointly by myself and our Technical Secretary Douglas Mills, which gives a potted history of the Institute and explains its current and future role in preventing corrosion, maintaining safety and extending service lives. We know we are wonderful – but I wanted to make sure the ‘movers and shakers’ were also aware of this fact. I won’t deny that most of our MP friends have had one or two more pressing matters to concern them lately, but the information is there for them to access once normal service has been resumed.

Looking into our history has highlighted that nothing stays the same forever. Indeed, gradual and considered change is essential for organisations such as ours to stay vital and relevant. We’ve already changed name and location a number of times in the past five decades and it is inevitable that it will happen again in the future. Nothing will happen without the agreement of the Membership and it is important that everyone’s views are heard. So as changes and challenges plus hopefully opportunities appear on the horizon, I would ask that you maintain contact with myself and the other Officers of the Institute and voice both your concerns and support. Whether you write personally or post your comments on the website via the Forum, your views are important.

Back to the more immediate future. I’m delighted to be able to announce that we have found a worthy (and willing) candidate as the next Vice President in David Worsley of Swansea University. Dave has extensive R&D experience, not least in coatings and recycling. He also claims a special interest in pre-BMW Minis, which would explain his thorough knowledge of corrosion processes.

So here’s to another fifty years. See you at the Centenary!

Inter-Institute Liaison

The Institute of Corrosion and the British Institute of NDT have been in regular discussions over the past two years, to see if any opportunities were available for closer working and collaboration. Initially, informal President-to-President discussions were held in 2007–2008 where possible collaborative initiatives in, for example, joint meetings, seminars and joint promotion of activities were discussed. From these preliminary meetings it became clear that substantial synergies existed between the two organisations.

Subsequently, after presentations to respective Councils in 2008/09, permission was obtained for the development of Policy Group meetings between senior representatives from both Institutes. The first series of these meetings has now been completed and has concluded that there are indeed good synergies and significant areas of cooperation between our organisations. Thus, whilst remaining as two independent Institutions, we believe we should take the opportunity to work together, to promote and to generally benefit from the best practice of each Institute.

The first definitive action arising from our discussions is to create, for each Institute, a Directory of the Products and Services that we provide to our individual members and other stakeholders. This will then provide a clear basis for identifying, explicitly, areas for cooperation, co-promotion, and co-production or to simply identify best practice and, hence, to benefit from the expertise that resides in both organisations.

Members will be kept informed of further progress.

London Branch Evening

At the London Branch evening on 12th March, members and guests enjoyed a presentation by Dr Kate Coleman on high temperature corrosion and the difficulties associated with it. There was emphasis on the corrosion problems faced by the power generation industry and with reference to an on-going research project in which various energy sources including bio-mass fuels are being tested with due regard to environmental factors.
The History of the Institute

NACE - “The engagement, the marriage and the divorce.” – CCEJV/CEA 1979 –1989

I am now into the third part of our 6 part summary of the History of our Institute, having completed the Early Days, 1958 and beyond, in the January/February issue and Part 2–BACE/ICorr Tech to ICorr ST-1967 to 1978, in the March/April issue.

When our President Paul Lambert asked me to start this series covering our 50th anniversary year with a small section in each copy of the six Corrosion Managements, during 2009, I asked any member, who had any historic information, photographs or documents to send them to me and to comment on my articles for additional information or corrections.

I would like to thank all the people for the black & white photographs from the early days and for the calls and written information received to date.

The Second Part, which featured the change of name from BACE/ICorr Tech to ICorrST raised a number of questions and requests for more information on the names and how these were selected. So before I start on my Part 3, on the joint venture with NACE, I will just give a little more background information on the name changes.

The Council of BACE made a proposal in October 1966 to change the name to the Institution of Corrosion Technology (ICorr Tech) this was agreed by the membership and there were no alternative names suggested at that time. When the merger of ICorr Tech and the Corrosion and Protection Association (CAPA) was being discussed the question of the name, recognising the activities of the two separate bodies, was of major importance to both memberships at that time. A constitution committee was set up in 1972, which comprised 4 Council members, from ICorr Tech and 4 Council members from CAPA, chaired by Henry Cole. It was agreed that both bodies would circulate a postal referendum to their respective memberships to obtain democratically the most popular name with the members of both bodies.

There was a list of 18 suggested names sent out on the referendum forms in 1974 and a further 11 suggestions were made by members when submitting their referendum returns from ICorr Tech and a further 8 additional names by members of CAPA (37 names in total). The membership of ICorr Tech numbered 480 in August 1974 when the referendum was sent out to all paid up members. 45% of the membership responded and the preferred name was the Institution of Corrosion Science and Technology.

The referendum was handled for ICorr Tech by Peter Neufeld, the Honorary Secretary, and the returns were scrutinised by Kathleen Bloomfield, the Head of Administration at the Belgrave Square offices. The referendum sent out to members of CAPA, of which there were 176 members at the time had a 59% response and again the preferred name was the Institution of Corrosion Science and Technology (ICorrST). The referendum for CAPA members was sent out by the Honorary Secretary Charles Booker and was scrutinised by Dr DP Whittle. The suggested new name was confirmed to the membership of both bodies on the 5th July 1974 and a joint Council statement was circulated, which stated, “The new name acknowledges the scientific interests of the new Institution, which will be strengthened by the ex CAPA side, most of whom are research workers. The titles of the present qualifications in Corrosion Technology, which will be retained, fall logically within this name”.

The British Joint Corrosion Group (BJCG), which was a small division of the society of Chemical Industry, did not wish to join the merger of the 2 major bodies.

The Members of CAPA form the Corrosion Science Division (CSD).

Following the merger and the official change of name on 1st January 1975, the membership expanded rapidly and reached 1000 some 4 years later, at the start of the joint venture with USA -NACE.

There had been a number of approaches to the American-based National Association of Corrosion Engineers (NACE) as early as 1962 by Jack Galloway, the then Chairman of BACE and also in the early 1970’s by Keith Jyluan Day, who was Chairman of the ICorr Tech, Technical Committee and a member of Council, however no serious discussions were held until 1979.

The ICorrST Technical Committee and the membership generally was expanding rapidly and in 1977 the Technical Committee arranged to form some parallel working groups with the NACE TPC and also for the Institution to organise a conference and exhibition on an annual basis. These activities were seen as the start of a conflict between some senior members of ICorr S&T and brought about a call for a break away formation of NACE in the UK as a separate section in competition to ICorrST.

The open NACE meeting, which was called to launch this potentially controversial development, was circulated to all NACE members based in the UK and was chaired by Ran Nicklin who ran a painting inspection company and was a past chairman of the Yorkshire Branch and a founder member of BACE. It was therefore viewed by a number of ICorrST members with considerable concern. Although there were a number of objections raised by members who attended the breakaway open meeting from the floor of the meeting, which was taken showed that the majority of NACE members present were in support of forming an “independent NACE UK Section.”

ICorrST officers met this move with considerable concern. An informal emergency meeting was held by the then President Ken Chandler and it was agreed that I would fly to the USA as Chairman of the Technical Committee and member of Council, to discuss this move and to express the ICorr concern with NACE Officials. I hand carried a personal letter from the President of ICorrST and this was handed to the Executive Director of NACE, Tenny Hull and his deputy Dale Miller. It was agreed that “a hold” would be put on any request from the UK for a formation of a NACE UK section until senior NACE Officers had visited the UK to discuss with the NACE members and ICorrST Officers alternative compromise arrangements.

In the end a satisfactory way forward was agreed, following visits by Dale Miller and Chuck Munger and so the Corrosion Control Engineering Joint Venture (CCEJV) was formed in 1980. The first CCEJV Executive committee comprised equal numbers of UK NACE members and the Technical Committee of ICorr ST. The initial work and diplomacy of Dale Miller, Bill Hewes and John Trim of NACE and Ken Chandler and Graham Wood of ICorr S&T should be recognised in the successful outcome of this arrangement.

The 1st annual conference launching the CCEJV Technical Activities was held at the Imperial Hotel in London on the 13th/14th October 1980 and consisted of 16 technical presentations and 12 work group meetings.
with over 200 delegates attending, it also showed a healthy return of over £3,000. This 1st conference and exhibition was an excellent success and an endorsement from the membership to the viability of the CCEJV.

The Technical Committee of ICorrST and the activities generated by that group were merged into the new CCEJV and the old ICorrST technical committee merged with the training committee. The annual conference, which rapidly expanded to 550 delegates in 1981 & 650 in 1982, was combined with the big independent Correx Exhibition, which was organised by the Morgan Grampian Publishing Group.

The conferences were supplemented by the rapidly growing Technical Activities Committees (TAC) of the CCEJV and although in 1981 there were just 13 unconnected random workgroups set up to parallel NACE TPC committees in the States, by 1987 there were 26 workgroups operating with sub divisions through 6 unit committee structures, the majority of which were linked through cross membership to committees of similar scope in the US NACE TPC.

The association and rapport between NACE and ICorrST through the CCEJV in those early days was extremely good and NACE never failed to send representatives from their TPC’s, and generally the Chairman of their International Relations Committee and their senior administration officers and on a number of occasions their President.

It was clear that the Technical Activities Coordinating Committee (TACC), which was established in 1982, was the key to success through production of well documented, “State of the Art” reports, which were widely circulated and sold to the general public. The first state of the art report was on sulphate reducing bacteria in July 1982 and by 1986 two NACE “recommended practices” documents were adopted by the US parent body and by 1986 CCEJV had a number of representatives on British Standards, ISO and NACE TPC Committees.

In 1983 it was decided by ICorrST and the CCEJV that they could run the exhibition, which numbered 80 exhibition stands in 1982 and take this away from the Morgan Grampian Publishing Group and their well publicised, “Correx” exhibition. This change of exhibition organiser created another rift within the membership of ICorrST.

The Morgan Grampian Group approached Ran Nicklin to run a conference alongside Morgan Grampian’s Correx, in direct competition to the conference and exhibition organised one month later by the CCEJV. The CCEJV and ICorrST responded strongly to this unfortunate competitive battle and eventually Morgan Grampian announced that they were cancelling their event, planned for 11-13th October, just 10 weeks before the scheduled date of the CCEJV event in Birmingham on 15-17th November.

This embarrassment to the Morgan Grampian/Nicklin event resulted in all of the Exhibitors and delegates switching to the CCEJV/ICorrST Exhibition and Conference and boosting the numbers to over 100 exhibitors and 800 conference delegates (our best ever attendance still to this day). Morgan Grampian never attempted to run another Corrosion Exhibition or Conference again. Right through the 80’s the CCEJV/ICorrST had the UK corrosion market to themselves. The name of CORREX was eventually dropped by Morgan Grampian and has now been acquired by ICorr and will be re-launched in October 2009 at NEC Birmingham.

Another initiative of the CCEJV was the Spring Work Week (SWW), which was held in May each year. This technical working week attracted a number of senior TPC, NACE officials over from the USA to join in the UK and European TAC committees. This SWW work produced a number of documents for circulation through both parent bodies. Our records show that the main 1985 SWW event had just under 300 attendees, some for only part of the programme and others for all of the sessions. It was designed to keep the costs to the members to an absolute minimum since nearly all of the attendees were contributing to the final documentation, which was not only to be sold, but to be published in the NACE Materials Performance magazine and the ICorrST Industrial Corrosion publication.

The growth of the CCEJV/TAC became widespread throughout Europe and North America with committee members, both visiting and corresponding. For example, the revision of RP-01-76 was reviewed by a joint task group T-1 2a in the UK, chaired by Fred Palmer of BP and T-1 2b based in Houston chaired by Jack Smart of AMOCO and all of the communications were sent to each of the parallel committees. The resulting revised RP document gave input on the protection of fixed offshore structures, in wide ranges of environments across the world.

In addition another task group was chaired and organised from Norway, and each one of the Chairmen travelled extensively to gather overseas membership. There were a number of individuals who chaired the technical activities work groups, but in particular, Brian Wyatt, Bob Crundwell, Eddie Field, Mike Clarke and Dave Harvey spring to mind as people who featured prominently during the successful 80’s. However special mention must be given to Fred Palmer of BP who was the first Chairman of the CCEJV Management Committee and who was a driving force throughout the 80’s.

Following the changes at NACE headquarters and the departure from various committees of the key NACE Officers and staff who had been so supportive in the formation of the CCEJV, the success of the venture made some NACE newcomers under the new Executive Director, Chip Lee, take a closer look at the benefits NACE, was achieving as a parent body. This change of personnel brought about a re-organisation of the way in which the CCEJV operated and was examined by a committee set up by NACE under the chairmanship of Prof Redvers Parkins (who incidentally was the only member of both parent bodies who became President of ICorrST and subsequently of NACE) The process of accommodating the required changes of NACE led to the closure of the CCEJV and the formation of a new body called the Corrosion Engineering Association (CEA). The CEA had registered charitable status in the UK and was responsible to a Board of Directors, which was composed of ICorrST, NACE and CEA representatives.

Although this was agreed by both parent bodies and eventually by the CCEJV Management Committee and TACC, within a short period of time at the end of 1988 NACE decided to set up their own UK office in Guildford, Surrey and to liaise directly with the NACE members rather than all of the CCEJV members through that NACE UK office. The majority of the CEA Board and the Council of ICorrST opposed this move and so it resulted in the winding up of the CEA and the formation of ICorrST Corrosion Engineering Division (CED), which incorporated, all of the technical activities previously run through the CCEJV and CEA. Sadly this was the final divorce with NACE, but shortly after they closed the NACE UK office and reverted the administration back to Houston.

It is very regrettable that this divorce occurred as the technical activities have progressively reduced since that time. The next part of our history will cover the development of the CED and the renaming of the Institution and will cover the period between 1990 and 2000.

By David H Deacon
Successful Corrosion Engineering Division Meeting at Buxton on April 23rd

By Nick Smart (Chair of CED) and Douglas Mills (Technical Secretary and coordinator of CED activities)

The Institute of Corrosion’s Corrosion Engineering Division (CED) recently ran a symposium entitled ‘Corrosion Failures and How to Avoid Them’ in collaboration with the Institute’s Yorkshire and NW Branches. The symposium took place at the government’s Health & Safety Laboratories (HSL), which nestle in the heart of the Peak District at Buxton in Derbyshire. The meeting attracted over 40 corrosion engineers from a wide range of backgrounds and industries. Having been warned by the HSL staff that there could be a few explosions in the background during the day(!), members were treated to a varied selection of invited talks. The day started with a welcome by Nick Smart, who then gave a useful overview of the CED and its activities. The main programme began with an introduction to the activities of the HSL, given by Phil Heyes, the investigations manager, and covered the services offered by HSL, ways of reducing hazards, and human factors. This was followed by a number of invited plenary talks on investigations and case studies of corrosion failures and ways to avoid them. The three talks in the morning were given by: Phil Munn from Sheffield Testing Labs: Investigating corrosion failures in closed water systems, Roger Francis from Rolled Alloys, An expensive failure in the power industry and Roger Hudson, formerly of Corus Steels, Miscellaneous cases and how they could have been avoided. These three talks attracted a lot of interest and they each provoked a healthy question and answer session! Then came a very interesting tour of HSL’s facilities, where we learnt about how the laboratories support government by investigating the causes of major incidents, such as rail accidents, gas explosions and fires, many of which are related to corrosion failures. Part of the tour covered the very important role that photography plays in recording these investigations and some of the challenges associated with this.

After a pleasant lunch, the attendees split into meetings of the newly reconstituted CED working parties (coatings, CP, corrosion monitoring, oilfield chemicals, water treatment, nuclear and corrosion in concrete). Each working group discussed the activities that had been planned at the previous meeting at Birmingham in October 2008 and followed the agendas that each working group chairs had prepared beforehand. (If any criticism was had of this meeting it was that the time for the business meetings was a bit short – this issue will be addressed for the next CED day). The programme then continued with talks by Marc Raymond from Aquatools, Use of ATP measurements for microbial control and Bill Cox from Corrosion Management, Monitoring to prevent corrosion failures. Again each talk was followed by lively debate.

The meeting closed with a humorous summing up by the Institute’s President, Paul Lambert. Minutes for the working group meetings will appear on the CED web site (http://www.icorr.org/branches/corrosion_engineering_division.phtml) in due course.

It was generally agreed that the meeting had been very successful, both from a technical and social point of view. The Institute is very grateful to the local organising committee (in particular Phil Munn and Paul Lambert). The difference between this sort of meeting and communicating using web sites is that real life contacts are made and these are more likely to be followed up. That was particularly true in the technical secretary’s case where the encounters he had, helped in his activities both within the Institute and in his research. Also the working party meeting he attended (coatings), although short, was efficient and covered a lot of ground. And that is probably what many people who attended found! Another meeting is planned for Autumn 2009. Details of the venue and the exact format and arrangements for this meeting will be circulated in due course and placed on the Institute’s web site.

Information about CED

The primary aims of the CED are to provide a forum for UK corrosion engineers in specific technical areas to communicate with each other, to disseminate relevant information, for example about forthcoming events, to review current technical practices and to produce new documents where required to meet current UK needs, whilst collaborating with the other international corrosion bodies (e.g. NACE, EFC, WCO). New documents will be approved and issued after ballot within the respective working groups, as Institute of Corrosion documents.

For information on who to contact to become involved with CED working parties, or to make suggestions or provide feedback on the arrangements for the CED meetings, please contact the Chair of CED, Nick Smart (nick.smart@serco.com), the coordinator, Douglas Mills, (douglas@hanbridge.freeserve.co.uk), or the chairs of the relevant working parties (see CED web site for details). We are currently using EGroups to facilitate discussion; in order to join please see the CED web site for details. If two or three people want to start a group of their own then also contact the authors.
During this year in CM the history of the Institute is being given in several parts. Thanks to David Deacon for this. Having been around a while (nearly thirty years a member), I thought in this TT, I’d just add my own personal contribution to this history stuff. Actually it is more like 35 years since I first got involved and for me, like for many people, it was through the conferences that the Institute and its predecessors organized. In the early days my interests were more on the academic side ie the side involved in running the Corrosion Science Symposia and in publishing journals. So recently I have become interested in trying to trace the history of that side and how it came together with the engineering side. To try to pin this down I have enlisted the aid of several senior corrosionists eg Tony Richardson, Graham Wood, Tony Mercer, Charles Booker, Robin Proctor and Brian Tunnard to name just a few. Hard facts are not easy to come by! (little written evidence seems to still exist - tidy minded people throw things out particularly when they move house it seems) So what I say below is not definitive. And there are still gaps.

It is the 50th Corrosion Science Symposium this year. The Corrosion Science Symposium was the “baby” of the academic group. I myself have attended about half of these: the three in the ’70s being 1974 (Cambridge), 1977 (Manchester) and 1979 (Bath). The first CSS was in 1960. Venue and organiser not certain - possibly in London? There is some indication that a Corrosion Science Society was founded about then and this could have been responsible for the early CSS’s. By about 1965 CAPA (Corrosion and Protection Association) existed (TK Ross, Silverman? and Sam Hoar being involved) and was running the CSS. The prestigious journal Corrosion Science (published originally by Pergamon and now by Elsevier) was founded by Hoar et al earlier than that ie 1960. So it seems CAPA may have been a “spin-off” from a Journal in much the same way as the engineering side, BACE, (British Association of Corrosion Engineers) whose origins were covered in the Jan/Feb CM. BACE was founded by a group involved with the journal Corrosion Prevention and Control (interestingly there is still (or was until recently) a journal with the same name) The (direct?) successor to BACE was the Institute of Corrosion Technology although the date when that change occurred is not known (certainly by the early 70s the “Bulletin” (the predecessor of Industrial Prevention and Control and then Corrosion Management) was being published by ICorrT). Then (as David Deacon tells us in his continuing history in the March/April issue), CAPA and the Institute of Corrosion Technology joined up to form the Institute of Corrosion Science and Technology on 1st January 1975 (later in 1988 there was the change of name to the Institute of Corrosion). This merger (or marriage?) between academic and engineering corrosionists has served the Institute very well. It is probably a unique feature among Institutes of our type and one that I personally have much appreciated. In theory the Presidency alternates between an engineer and an academic (in fact the current President has both strings to his bow!) We of course still maintain the two divisions (Corrosion Science Division (CSD) and Corrosion Engineering Division (CED).

Just going back to Corrosion Science Symposia, it is interesting to note that the 1974 symposia attracted 155 people including many from industry. The old CEGB sent a particularly strong delegation and continued to do so until the break up of the electricity industry (as an aside how many people these days from the electricity companies attend technical meetings run by the Institute? - in fact is there anybody left in them who knows anything about corrosion…?)

In relation to UK based Corrosion groups there is one which predates the Institute. In about 1956 (or earlier?) a number of people, of whom W J Vernon was one, set up a “Corrosion Group” within the Society of Chemical Industry (Belgrave Square) perhaps in competition to NACE (?). This has remained separate from the Institute of Corrosion. (the corrosion “Division” of IOM3 might claim to be its successor) Later (in about 1965) the SCI group created the British Corrosion Journal (initially published by SCI later by Institute of Materials and most recently (having changed its name to CEST) by Maney).

Well all that is rather dry stuff! I though I’d just finish with a corrosion image taken on a recent visit by myself and family to Calke Abbey, a National Trust property near Derby. This tank/hut appears to be something of an “exhibit” within the grounds (it is very near the tea shop and not far from the house itself). I did wonder whether, as a gesture in our 50th anniversary year, individuals and companies within the Institute could offer their services (in return for eg a plaque!) to get this tank/hut back into a reasonable state! Any help with this “project” or correcting/addition to the history part would be gratefully received.

e-mail as usual
Douglas@harrbridge.freeserve.co.uk
It is with great sadness that I report the recent death of Tony Logan, a long-serving past Chairman of the London Branch. Tony worked for Winn and Coales (Denso Ltd) for 41 years in various technical positions, before retiring in 1995 as their Quality Assurance Manager.

He enjoyed much encouragement from his company to contribute time and effort in supporting our Institute and the London Branch in particular. This was demonstrated by the attendance at the Technical Evening Meetings by many of his work colleagues, including David Winn OBE. David also agreed to be a guest speaker at one of the Christmas Luncheons.

Tony took over as Branch Chairman from Fred Palmer and served for nine years before handing on to Mike Allen. There were many major and worthwhile developments during this time, including moving the evening meeting venue from a hotel room in Holborn to the Naval Club, which has proved an ideal home base for many of our activities. The very successful Annual Christmas Luncheon was also launched and now attracts over 150 guests.

In his private life, Tony was very much in tune with nature, enjoying nature walks and was a recognised authority on bird-watching and organic gardening. His personal motto following a visit to Japan was “Moderation in everything” which he would add with a smile that this also including “moderation in moderation” and thus occasional extremes were to be encouraged.

Tony was fully committed to our Institute and will be fondly remembered by all those who knew him. His funeral at the Beckenham Crematorium was well attended.

John T O’Shea, Past President
50TH ANNIVERSARY EVENT – 21- 05 - 09
Not an empty seat in the house - from professors to painters

The 50th celebratory Anniversary Event on 21st May 2009 (the exact date since the inaugural meeting of BACE in 1959) was really a great success. As members will be aware the venue for the event was the Thames Barrier in London and our hosts for the event were the Environment Agency, who provided tours of the Barrier’s infrastructure and working mechanism prior to the technical seminar held at the Barrier’s Conference Centre.

I was delighted to be able to give the Welcome Address to the 125 Members and guests, who were able to attend and although the EA were able to increase the seating capacity from 110 to 125, by providing us with extra seating, we were having to turn Members away long before the event, since attendance was strictly on a, ‘first come, first served’ basis, and there was “not an empty seat in the place”.

The Welcome Address was directed to our individual Members, our Sustaining Member Companies, our special VIP guests, our hosts, our sponsors and our Past Presidents. The individual Members who were present and some have been Members for the full 50 years and our more recent influx of Sustaining Company Members, which had expanded our individual Membership to include representatives of these Companies, who would not normally join the Institute in their own right.

As Members will have seen in the 50th issue of Corrosion Management, we had selected ten special VIP guests and each one of these was welcomed. The VIP’s, Derek Bayliss, Charles Booker, Gordon Currer, Harry Hatley, Jack Tighe, Brian Tunnard were all present, but regrettably Graham Wood was not able to attend. In addition, Nicola Galloway, grand-daughter of Jack Galloway was there to represent her grand-father and Adam Tiratsoo represented his father and grand-father, which emphasised the theme of, “across the generations”.

All of the VIPs were presented with a gold-framed certificate, by the President, which recognised their special role and affiliation to the Institute over the 50 years.

The Rt Hon Tony Benn, who was selected by the organising committee as a VIP for his influential role as Minister for Technology in 1969 was also unable to attend, but he wished us all the very best by letter, which was reprinted in the special programme circulated to all members.

The welcome to the sponsors, whose generous financial contributions made the event possible was next and a tribute was given to these Sustaining Member Companies for their on-going support. The list of these organisations is as follows:

**MAJOR SPONSORS**
- Environment Agency – Thames Barrier
- Atkins PLC Water Division
- PPG – (Ameron/Sigma)
- Square One – Publishers

**SPONSORS**
- Anglia CP Services • Hockway • BAC Corrosion • Impallay • Cathodic Protection
- Leighs Paints • Concrete Repairs • Penspen
- Corrosion Control • Pipeline Maintenance
- Corpro Europe • Pyeroy • Deepwater Services • Strada • FA Clover & Sons
- Steel Protection Consultancy Ltd • Halcrow

Finally we were able to welcome 8 Past Presidents of the 28 who had held that important role over the 50 years and there were only 4 living Past Presidents, who had been unable to attend, due to business commitments or overseas travel.

Our President Paul Lambert presented the main Keynote Address and thanked the Organising Committee for the excellent work in putting together a suitably special celebration for our Golden Anniversary. Paul made a very entertaining and meaningful presentation, covering various aspects of the Institute’s development.

He referred to the role of Tony Benn as Minister for Technology in the 60s and the setting up of the TP Hoar Committee on the Cost of Corrosion and how this had affected the development and merger of the major corrosion societies in the 70s and how the Institute had developed to the present day. He also looked at the way forward for the next 50 years and thanked the EA for their support and organisation of the event on the day.

He was also able to announce the name of the incoming Vice President Professor David Worsley of Swansea University.

There were two major technical presentations, the first one by Martin Earlam – Asset Manager of the Barrier on the successful corrosion control techniques adopted to protect London’s Thames Barrier from corrosion, this was particularly relevant since two of the consultants were present Derek Bayliss and Harry Hatley. Jack Tighe the founder of the company, which had applied the successful coating system was also in attendance. Martin also explained to Members the working of this famous structure, which had been opened by the Queen exactly 25 years ago, this month.

The second technical presentation was planned to cover bridges and was given by Barry Colford, the Chief Engineer and Bridgemaster of the Forth Road Bridge. This world famous suspension bridge structure had also been opened by the Queen in 1964. The paint systems, which had been so successful, were started to be tested in 1959, the very year when the Institute was formed. Barry’s paper was included in the last edition of Corrosion Management, so Members who were not in attendance on the 21st May, will be able to read all about the success of that structure.

The third technical item was a pipeline protection panel discussion organised by Past President, Brian Wyatt. Brian had arranged an excellent panel grouping, covering the early days with Harry Hatley and Gordon Currer and working across the Pipeline generation, the highlights of which were presentations by Dave Harvey, Trevor Osborne and John Thirkettle with questions being asked by the Members present at the completion of the three talks.

The finale of this very successful and enjoyable day was the presentation by President Paul Lambert of gold-framed certificates to all of the VIP’s and the representatives of the sponsoring companies.

Finally Paul presented a special silver plaque to Gill Inwood, who has been the Administration Office Manager with ICorr for exactly 20 years, having joined ICorr when the Institute moved to Leighton Buzzard in 1989. Denise Aldous, who was the main ICorr team member responsible for organising the programme and who has now been with us for 1 year after joining us from Sigma when we moved away from Corrosion House, also received a token of the Membership’s appreciation.

The many phone calls, letters and e-mails, since the event, from our Members and their guests who attended have confirmed that the efforts put together by the Organising Committee had resulted in a very successful 50th anniversary event, which will be remembered for many years to come.

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David H. Deacon
Chairman Organising Committee.
The Role of Surface Cleaning as a Preliminary to Satisfactory Coating Application

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INTRODUCTION

Effective surface preparation is widely regarded as being a necessary prerequisite for satisfactory coating application. The experimental work on which this paper is based formed the initial phase of a larger project which was ultimately concerned with the modification of organic coating formulations. The process of choosing a cleaning solution and the necessary process parameters is outlined and it is intended that this will highlight some of the attributes which are important when specifying a cleaning process and identifies some pertinent analytical techniques. Aqueous alkaline cleaning solutions were used throughout the project, these being more environmentally acceptable than cleaning solutions based on organic solvents, whose use is being restricted by legislation such as the solvents directive1.

The process of choosing a cleaning solution is that contaminants can be readsorbed as the sample is removed from the solution. For this reason, the effectiveness of rinsing the samples in fresh solution after immersion was considered.

EXPERIMENTAL PROCEDURE

Materials and Processes

Two different proprietary aqueous alkaline solutions were studied for comparative purposes, both being operated at the manufacturers recommended temperature of 75°C +/-3°C. Solution ‘B’ was more alkaline than ‘A’, the solutions having pH values of 9.4 and 12.0, respectively. Samples were cleaned by immersion for 30, 60 or 600 s in the appropriate solution and the solution was agitated by either magnetic stirrer or ultrasonic agitation. After cleaning, samples were rinsed with deionized water and dried in an oven at 80°C. One potential problem with an immersion process is that any contamination removed from the surface may be readsorbed as the sample is withdrawn. For this reason, the effect of rinsing the sample with fresh cleaning solution, heated to the operating temperature, was also investigated. The sample panels used were hot dip galvanized (HDG) steel with a coating thickness of approximately 60-70 μm and measuring 200 mm x 100 mm. The HDG samples were non temper rolled, with the exception of those subjected to surface free energy testing and were coated with an oil to prevent corrosion in storage.

When examining the composition of the surfaces, the cleaned panels were assessed against an as-received control sample. However, for the contact angle and electrochemical tests, the samples were rinsed with acetone and wiped. This is particularly important when measuring the contact angle, as otherwise the result would represent the surface free energy of the contamination layer, rather than the HDG itself.

Compositional Analysis and Microscopy

There are numerous methods for studying contamination based on surface compositional analysis. For this study, Auger electron spectroscopy (AES) was adopted, this technique being particularly suited to studying surface contamination, as Auger emission occurs from the first few atomic layers 2. Surface sensitivity is also an attribute of X-ray photoelectron spectroscopy (XPS), making this another technique suited to such studies. Sputtering of the sample using noble gas ions, such as Ar+, can also be used in conjunction with either technique to generate depth profile information.

Experiments were conducted using a JEOL JAMP-7100 operating with a primary beam energy of 10 x 10³ eV and a spot size of 100μm. Compositions derived from the spectra were based on relative sensitivity factors including ZnO powders in In foil. For each set of cleaning conditions, a minimum of two samples was examined. The surface of the samples was also examined using a LEO 1530VP field emission gun scanning electron microscope (FEGSEM) operating in secondary electron detection mode using...
an accelerating voltage of 20 kV. The energy dispersive X-ray (EDX) analysis function of the FEGSEM was also used to produce maps indicating the distribution of elements on the surface.

**Profilometry**

Information regarding the etching effect of the cleaners on the HDG panels was obtained by profilometry, using a Taylor-Hobson Talysurf 4 with Surtrace surface analysis software. An evaluation length of 4 mm was used and this was filtered into 5 cut-off lengths of 0.8 mm to allow calculation of the average surface roughness, \( R_a \). Results were then averaged from three tests.

**Surface Free Energy Measurements**

Surface free energy measurements were performed using the advancing drop contact angle method at several points on the surface of each sample. Temper rolled HDG panels were adopted for these tests, as the surface roughness of the non temper rolled galvanizing layer would otherwise have had a bearing on the results. A Data Physics OCA-20 apparatus was used, with deionized water and diiodomethane as the reference liquids. Contact angle values were exported into Microsoft Excel and surface energy values were calculated using the Owens-Wendt and Kaelble method.

**Corrosion Testing**

While accelerated environmental techniques such as neutral salt spray corrosion testing are frequently adopted in industry to assess degradation, the method of assessment is subjective and agreement between test cabinets is poor. It is also an aggressive test which, while applicable for studying, for example organic coatings, would cause problems when differentiating between samples which have been deliberately stripped of any protective surface contamination or oxides by cleaning. There are numerous electrochemical techniques available, including D.C. techniques such as polarization scans and A.C. techniques such as electrochemical impedance spectroscopy. Of these, linear polarization resistance (LPR) tests are a quick and convenient method to generate numerical values of polarization resistance which can be used to produce a ‘ranking’ of the corrosion resistance of the samples. LPR tests were conducted using samples measuring 50 mm x 50 mm cut from the HDG sample panels and then masked with inert adhesive tape, leaving an exposed area of 40 mm². The samples were then immersed in 3% w/v NaCl solution for 60 min before testing. Two samples were cut from two different panels, giving four tests in total.

An EG+G model 263A potentiostat controlled by Electrochemistry Power Suite software was used to perform the experiments and a three-electrode arrangement was adopted with an 80 mm² platinum auxiliary electrode and saturated calomel (SCE) reference electrode. The potential range was -20 to 20 mV vs. SCE at a sweep rate of 10 mV min⁻¹. The data acquired was exported into Microsoft Excel and plotted in graphical form, determination of the polarization resistance being achieved manually by drawing a tangent to the line where the current flow was zero and calculating the gradient of the line.

**RESULTS**

**AES Data**

AES provided full elemental analysis of the composition of the surfaces, as demonstrated in Table 1, which includes a selection of results. However, a measure of the effectiveness of the cleaning process was obtained by calculating the metal to carbon ratio. The presence of carbon is typically indicative of contamination, in this case the oil applied to the panels, while metal, in this instance zinc, is representative of the HDG layer. An increase in the Zn:C ratio therefore suggests an improvement in surface cleanliness. As Figure 1 shows, the Zn:C ratio increased with immersion time. The data shows that even after 10 min immersion in solution A with stirrer agitation, the Zn:C ratio was still lower than for solution B at shorter immersion times. The improvement in cleaning effectiveness with ultrasonic, as opposed to stirrer, agitation is also apparent.

AES data also showed that the HDG coating contained aluminium, which is typically added to control the formation of intermetallics.

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<th>Sample</th>
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<tr>
<td>As-received HDG panel</td>
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<tr>
<td>1 min immersion in solution A with ultrasonic agitation and post-rinse in fresh solution</td>
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</tr>
<tr>
<td>1 min immersion in solution B with ultrasonic agitation and post-rinse in fresh solution</td>
<td>0.0</td>
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Table 1- AES Compositional Data from Selected Samples
The results also showed that solution B stripped this aluminium from the coating, while solution A did not. It might therefore be argued that the Zn:C ratio will bias the results in favour of solution B and that a more appropriate measure of the surface cleanliness would be given by the ratio of aluminium and zinc to carbon. However, as Figure 2 shows, even when the contribution from aluminium was included, solution B still gave a higher Al+Zn:C ratio, except with 30 s immersion, where solution A was marginally higher.

Considering 1 min to be an acceptable immersion time, the Zn:C ratios for different cleaning trials are shown in Figure 3. It can be seen that, whichever solution was used, ultrasonic agitation improved the removal of contaminants from the panels. However, solution B gave a Zn:C value which, even with stirrer agitation, was comparable to the most effective process with solution A. A post-rinse with heated alkaline cleaning solution increased the Zn:C ratio still further, implying that, as previously suggested, the panels were re-contaminated as they were removed from the solution.

Microscopy

The effect of the cleaning process on the surface morphology was examined with the FEGSEM. Both solutions A and B were investigated to compare their effects with ultrasonic agitation at different immersion times. In addition an acetone degreased panel was studied. Several areas were examined on each sample to ensure that the micrographs acquired were representative of the overall surface condition.

Figure 4 shows the surface of a sample degreased with acetone. The patterning on the surface probably corresponds to the grain boundaries of the HDG coating. Defects are visible on the surface, including a dark area which looks as if it could be a hole, scratches and craters (indicated in the image by a circle). An attempt was made to generate EDX elemental maps of the area shown in Figure 4 to determine the location of the different elements in the HDG layer. These are reproduced in Figure 5. The area visible in the iron map appears to correspond to the defect seen in Figure 4 and confirms that this is a hole in the coating.

Figure 6 shows the surface of a sample immersed in solution A for 30 s produced a surface which appeared reasonably homogeneous, as shown in Figure 6. The sample appears to be visually comparable...
to the acetone degreased panel. There are, however, fewer defects on the surface, although this is more likely to be variation in the individual panels rather than a facet of the cleaning process. After 60 s immersion in solution A, the surface morphology still appears very similar to the acetone degreased panel shown in Figure 4. This is apparent from the micrograph shown in Figure 7. It was also noted after studying several different areas that the surface of the sample was relatively consistent in its appearance. The two micrographs reproduced in Figure 8 show the surface of a sample cleaned for 600 s at two different magnifications. At lower magnification, the surface still appears similar to the acetone degreased sample but at higher magnification a degree of surface etching can be seen.

After only 30 s cleaning in solution B, a change in the surface appearance compared to the acetone degreased panel can be seen, as shown in Figure 9. At lower magnification, linear striations can be seen crossing the grains, presumably caused by the etching effect of the more alkaline solution B. The AES data showed that even short immersion times in solution B removed the aluminium from the coating and the observed change could be attributable to this effect. A surface defect is shown at higher magnification in Figure 9b. This resembles the craters observed in Figure 4. Increasing the immersion time to 60 s did not have a discernible effect on the surface morphology, as can be seen in Figure 10. It could be that at shorter immersion times, the predominant effect is still the removal of contaminants from the surface, following stripping of the aluminium.

Figure 11 shows the surface of a sample after 10 minutes immersion in solution B. Comparing these images with those in Figure 8, the etching effect of this solution is shown to be much more pronounced than the solution A. In Figure 11b, there is an area in the centre of the image where the HDG layer appears to have been completely penetrated. Two micrographs are included here to also highlight the difference in the appearance of the two different areas. This non-uniformity could be caused by the more aggressive solution B preferentially etching areas where there are existing irregularities, such as those indicated in Figure 4 and Figure 9.

**Profilometry**

Profilometry tests were performed during the early stages of the study before the use of ultrasonic agitation was considered. However, the results, given in Table 2, allow the effect of different cleaning solutions and process times to be assessed. Three different areas of each sample were tested and the data averaged. The results in Table 2 show that all of the cleaning procedures are capable of engendering an increase in the average $R_a$ value. Large variations in the individual results make comparisons between the different cleaning processes difficult. For example the second $R_a$ value obtained for solution B, 1 min immersion with stirrer agitation was considerably higher than all the other values.

When the profilometry trace was examined (Figure 12) a large indentation was visible in the surface. This could have been due to a scratch or other surface defect. Further profilometry tests of the samples would...
reduce the error caused by such results. However, the average R\textsubscript{s} values do show that the surface roughness was increased by all the cleaning processes examined.

### Surface Free Energy Measurements

Figure 1 shows that both alkaline cleaning solutions can improve the wettability of the HDG panels by removing contaminants from the surface. For solution A, a 30 s immersion was not sufficient to increase the surface energy compared to an acetone degreased panel. Increasing the immersion time to 60 s and then 600 s resulted in an appreciable increase in surface energy.

It is more difficult to interpret the results for solution B, as 30 s or 600 s immersion resulted in a higher surface energy than any of the solution A cleaned samples but the two 60 s immersion samples do not. Without a further rinse, the wettability of the sample was comparable to the acetone degreased panel.

Although it is possible that these panels were not typical, it is unusual that two separate samples should have produced results which do not coincide with the trend observed for the samples cleaned with solution A. This could be considered as further evidence that the cleaning effect of solution B is less reproducible than solution A.

### Linear Polarization Resistance (LPR)

The results in Figure 14 show that the panels degreased with acetone had the highest polarization resistance. This is due to contaminants on the surface and possibly also oxides which will have formed since the HDG coating was applied. The lower value for the panels cleaned in solution A can be attributed to the removal of the contamination and oxides, resulting in a more active surface, while the removal of the aluminium and etching through the HDG layer by solution B was probably the cause of these samples having the lowest polarization resistance.

### DISCUSSION

#### Selection of Cleaning Solution

The AES data suggests that solution B is more effective than solution A at removing surface contamination from the HDG panels, as demonstrated by the Zn:C ratios. Solution B seems to have the effect of removing not only the oils present on the panels but also of removing the aluminium which is incorporated in the galvanizing process, in addition to a more general etching of the surface. However, the LPR data suggests that the removal of this aluminium may be detrimental to the corrosion resistance of the cleaned panels. Certainly after longer...
immersion times, solution B had the effect of not only removing the aluminium but also etching through the zinc which forms the greater part of the coating, as shown in Figure 11. Exposing the steel substrate will inevitably compromise the efficacy of the HDG layer.

Both the AES and surface free energy data also suggest that solution B was more susceptible to variations in the process parameters. Additionally, the FEGSEM examination showed that solution B had a cleaning effect which was less uniform, possibly as a result of its more aggressive etching of the surface. For the purposes of coating application, it is desirable to create a surface which is not only clean but also reproducible.

**Effect of Agitation**

Comparisons between magnetic stirrer and ultrasonic agitation showed the latter to be a more efficient means of removing contamination from the surface. This is the case for both solution A and solution B, as shown in Figure 3. For solution B, the AES data showed that after 1 minute immersion with ultrasonic agitation, although carbon is still present, the cleanliness of the panels was comparable to a 10 minute immersion using magnetic stirrer agitation. From a practical perspective, a shorter immersion time is desirable, making the use of ultrasonic agitation superior in this respect. It was therefore decided that ultrasonic agitation would be used for cleaning panels prior to coating.

Figures 3 and 13 also confirm the need to rinse the panels with fresh solution after immersion to remove contaminants which are returned to the surface of the sample as it is withdrawn from the cleaning bath. This was also demonstrated by a trial in which a sample panel was cleaned by rinsing with solution A only, with no prior immersion. Even this had the effect of increasing the Zn:C ratio from 0 to 0.910.

**Effect of Immersion Time**

Selection of an immersion time for cleaning the panels is a compromise between the resulting cleanliness of the panel and time constraints when many samples need to be processed. The effect of increasing the immersion time on the cleanliness is summarized in Figures 1 and 2. Figure 2 in particular suggests that with solution A, there was little improvement to be obtained by increasing the immersion time beyond 30 s. The micrographs also show that there was no visible change in the surface by increasing the immersion time from 30 to 60 s in solution A. However, considering the surface energy data in Figure 13, it was felt that an immersion time of 60 s would produce a more satisfactory substrate on which to apply organic coatings.

**Conclusions**

A range of analytical techniques were applied to the optimization of a cleaning process for HDG steel panels. Although compositional analysis suggested the more alkaline solution B was more effective at removing contamination, solution A was found to offer a better compromise between cleaning effect and reproducibility.

Compositional analysis and surface free energy measurements demonstrated that ultrasonic agitation is beneficial to the cleaning process, allowing a higher degree of cleaning for shorter immersion times.

**References**

2. N.L. Thomas, Progress in Organic Coatings, 19 (1991)) 101-121
5. L.F.G. Williams, Surface Technology, 5 (1977) 105-117
Archco-Rigidon Protection for Hose Couplings

Dunlop Oil & Marine Ltd, based at Grimsby, is a world leader in the design, manufacture and supply of hoses for the oil, gas, petrochemical and dredging industries, for both of offshore and onshore operations. Its extensive range of hoses are of a rubber composite structure in approximately 40ft maximum lengths, with steel fittings for connections.

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Winn & Coales (Denso) Ltd. Chapel Road, London SE27 OTR
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<td>Email: <a href="mailto:dave.swift@watsonsteel.co.uk">dave.swift@watsonsteel.co.uk</a></td>
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<td>Tel: 020 85908523 Fax: 020 85909885</td>
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<td>Tel: 0161 609 0000 Fax: 0161 609 0468</td>
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<td>Tel: 0207 7991889 Fax: 0207 9768169</td>
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<tr>
<td>Corrosion Management Ltd</td>
<td>Engineering Consultants 21 Sedlescombe Park, Rugby, CV22 6HL United Kingdom</td>
<td>Tel: 01788 816231</td>
<td>Email: <a href="mailto:cox@corr-man.demon.co.uk">cox@corr-man.demon.co.uk</a></td>
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DIARY DATES 2009

16th September – 17th September
50th Corrosion Science Symposium
Venue: The University of Manchester
Running as a session of the RSC/SCI Electrochem 09 Conference.
Local organisers: Nicholas Stevens (ICorr) and Rob Dryfe (RSC).
Email: nicholas.stevens@manchester.ac.uk
Abstract Deadline: 31st May 2009

14th September – 18th September
Fifth International Conference
- Advances in Corrosion Protection by Organic Coatings
Conference organiser: Professor David Scantlebury, The University of Manchester
Conference venue: Christ’s College, Cambridge
Contact: Fiona.Fraser@manchester.ac.uk
www.manchester.ac.uk/materials/events

27th, 28th & 29th October
Surface World with CORREX 2009
Venue: NEC, Birmingham
Enquiries & stand bookings:
Contact Nigel Bean, Sales Director on +44 (0)1442 826826
email: nigelbean1@aol.com
www.surfaceworldshow.com
For conference enquires please contact Denise on 01525 851771.
Institute of Materials, Minerals & Mining
Corrosion Committee Meeting
One Day Conference on: “Underground Corrosion”
DATE: TBC
Venue: The Health & Safety Laboratories, Buxton
Enquiries: john.thirkettle@thorcorrosion.co.uk
r.akid@shu.ac.uk

11th November
Back to Basics: The Essentials of Protecting Structural Steel by Protective Coatings and Paints
One Day Seminar
Venue: Cedar Court Hotel, Bradford
Enquiries: Mr. G. Manning, Tel: 0121 493 2600
Fax: 0145 066 71
Email: graememanning@blueyonder.co.uk
Dr. D. Greenfield, Tel: 0114 252973
Email: d.greenfield@shu.ac.uk

SHORT COURSES

9th-12th November
Corrosion Control in the Oil and Gas Industry
Amsterdam: - Further details contact Colin Britton,
Tel: +44 (0)1480-860943 Email: cbrit79727@aol.com
or website at www.cfpa.com

Details of all Branch activities, dates and venues can be found at www.icorr.org

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