

MATERIALI IN TEHNOLOGIJE – 40 LET MATERIALS AND TECHNOLOGY – 40 YEARS

Če ocenjujemo po zgledu znanstvenih in strokovnih revij, ki se tiskajo v državah, ki so tehnološko in industrijsko bolj razvite od Slovenije, štiridesetletnica izhajanja ni posebno visok jubilej. Je pa pomemben, ker se je v tem obdobju v Sloveniji metalurgija, že stoletja uveljavljena industrijska proizvodnja, utrdila tudi kot inženirska stroka in postala inženirska veda. Obdobje konec 90. let prejšnjega stoletja je bilo kritično za metalurško industrijo, saj je precejšen del politike, ki je skušal premalo premišljeno uveljaviti nove gospodarske in ekološke poglede, zavračal obnovo metalurških proizvodnih naprav. Na srečo te ideje niso dobile večinske podpore, metalurgiji jekla in aluminija pa sta se z investicijami v nove proizvodne naprave približali standardu ekološke sprejemljivosti tehnologije, ki jih zagovarja zbornik "The State on the World", ki ga vsako leto tiska The Worldwatch Institute iz Washingtona, ZDA.

Od vseh industrijskih panog je v Sloveniji metalurgija najbolj prenesla tranzicijsko obdobje. To dokazuje dvoje: bila je bolje kot druge industrijske veje tehnološko usposobljena za prehod v nove tržne razmere in, nasprotno od prerokovanja mnogih, poraba in proizvodnja kovin in zlitin se v novem tisočletju nista zmanjšali, temveč sta celo zelo zrastle. Manjši tehnološki zaostanek metalurgije za najbolj razvitimi okolji je bil brez dvoma tudi rezultat ustvarjalnega sodelovanja tehnologov in raziskovalcev v industrijskih podjetjih z raziskovalci v akademskih ustanovah.

Prav okrepitev in razširitev ter seznanjanje javnosti z dosežki raziskovalno-razvojnega sodelovanja so bili najmočnejša opora ideji o začetku tiskanja nove revije, namenjene objavam znanstvenih in strokovnih del, namenjenim obravnavi praktičnih in z njimi povezanih teoretskih dosežkov pri raziskavah zgradbe, vedenju kovin in zlitin pri predelavi v uporabno obliko in lastnosti pri uporabi. Težišče je bilo na jeklu, kjer je bilo tedaj največ dobro organiziranega raziskovanja. Zato je nova revija dobila naziv *Železarski zbornik*. Izhajala je četrletno in v njej so bila tiskana mnoga kakovostna znanstvena in strokovna dela, dokaz ustvarjalnosti in trdega dela številnih posameznikov, ki so pogosto prišli do pomembnih izvirnih dosežkov z inventivnim metodološkim načinom na podlagi izsledkov preizkusov in analiz na rutinski laboratorijski in analitski opremi. Kakovost raziskovalno-razvojnega dela, posebno s stališča boljšega poznanja dogajanja med procesi v talini in v trdnem, je zrastle zaradi dognanj, ki jih je omogočala nova raziskovalna oprema v podjetjih in na akademskih institucijah.

Compared to some journals in countries that are more developed in terms of technology and industry than Slovenia, 40 years of publication is not a particularly significant anniversary. It is, however, very important, as during this period of time metallurgy, an industrial activity with centuries of tradition in Slovenia, matured as an independent engineering profession and became an engineering science. The period up until the end of the 1990s was a critical one for the metallurgical industry, as there was strong political opposition to the refurbishment of metallurgical production facilities based on ill-considered economic and ecological measures. However, the attempt did not receive sufficient support and so the steel and aluminium industries were able to invest sufficient funds in new production facilities and approach the acceptable ecological standards recommended in the survey "The State of the World", published by The Worldwatch Institute, Washington, USA.

Of all the branches of industry in Slovenia, metallurgy was the most successful in getting through the transition period. This suggests that it was better technologically qualified to access new markets than other branches of industry, and contrary to expectations, production levels began to increase in the 21st century. The reason why metallurgy did not lag behind as much as other branches of industry in Slovenia was at least partly due to the fruitful cooperation in research and development between researchers from academic institutions and those from industry.

It was the cooperation between scientists working on the problems of improving technologies and developing new alloys that was at the heart of the decision to publish a new journal, some 40 years ago. In this way, the achievements of scientific investigations on practical and related theoretical topics, such as the melting of alloys, their structure and their behaviour when processing finished products and their properties during use, would be made known to the public. The accent was on steels, since this was the field with the most organised research and development, and so the name of the journal was chosen as *Železarski Zbornik*. Professional and scientific articles presenting new findings, often based on the inventive use of routine testing methods, were published quarterly. The quality of the articles increased significantly, especially for processes and properties related to the microstructure and homogeneity of alloys, when new scientific facilities were set up in academic institutions and in industrial laboratories. Focused scientific research helped to close the gap on

Del zaslug za lažjo prilagoditev na nove tržne razmere po osamosvojitvi Slovenije ima gotovo tudi večja učinkovitost raziskovanja in razvoja. Zato sta tehnologija in proizvodi tudi tam, kjer oboje ni bilo odvisno od velikih investicij, zaostajala največ nekaj let za najbolj razvitimi okolji. V delih, ki so bila objavljena v reviji *Železarski zbornik* lahko dobro spremljamo rast znanja o strjevanju zlitin, razvoj tehnologije desoksidacije in razžveplanja jeklene taline, izoblikovanje mikrostrukture med vročim in hladnim preoblikovanjem, izboljšanje racionalnosti porabe energije, razvoj proizvodov z lastnostmi za specifične pogoje uporabe, razvoj raziskovalne metodike, tudi rezultate postopnega zmanjšanja obremenitve okolja in še marsikaj, kar se lahko razbere iz naslovov v bibliografski številki, ki je bila tiskana ob 40-letnici izhajanja. Med avtorji objavljenih del najdemo najpomembnejše raziskovalce iz domačega okolja, laureate državnih nagrad in vidna imena iz tujine. Posebna odlika revije je veliko število avtorjev iz industrijskih okolij in prav takim gre zasluga, da se je revija izognila nevarnosti, da bi se metalurgija kot veda v Sloveniji preveč oddaljila od metalurgije kot industrijske tehnologije.

Jugoslavija je bila v obdobju ekonomske krize že po letu 1986, tej krizi se je v Sloveniji pridružila po letu 1989 še tranzicijska kriza, katere vzrok je bila izguba dotodanjih trgov za industrijske proizvode. Politika ni bila posebno učinkovita pri pomoči industriji pri premagovanju krize, zato se je, nasprotno kot v razvitih okoljih, zmanjšal obseg raziskovanja in razvoja v industriji in posledično tudi obseg raziskovanja v akademskih institucijah. Tudi revija je prišla v krizo, ki se je še povečala zaradi finčnih težav izdajatelja.

S spremembo naslova revije v *Kovine Zlitine Tehnologije* je bil leta 1992 napravljen prvi korak k razširitvi vsebinske podlage revije na raziskovanje in razvoj najpomembnejših inženirskih materialov: kovin in zlitin, keramike, gradbenih materialov in polimerov ter z njimi povezanih tehnologij, tudi vakuuma in tehnologij oplemenitenja površine, vlogo izdajatelja pa je prevzel Inštitut za kovinske materiale in tehnologije. Uredniški odbor je bil dopolnjen in vanj so bili vključeni raziskovalci iz drugih področij in procesov. Postopoma so bili pridobljeni tudi soizdajatelji, ki so poskrbeli za materialno podporo izhajanja. Ukrepi so se pokazali kot zelo učinkoviti, saj je skokoma močno zrastle število avtorjev in število tiskanih del ter tematika, ki je bila v njih predstavljena.

Kot samoumevno se je zato pokazalo ponovno preimenovanje revije v današnji naziv *Materiali in tehnologije* (Materials and Technology) in ponovna dopolnitev uredniškega odbora. S predlogom, da se vsebina revije obogati s predstavitvami novih doktorjev znanosti s področja raziskovanja materialov in najmodernejših tehnoloških dosežkov v podjetjih, še ni dosegla pričakovanega uspeha.

Po letu 2000 se je uradna politika pri oceni kakovosti objavljenih raziskovalnih dosežkov popolnoma naslonila na objave del po uvrstitvi revije v indeksu citiranosti SCI

the more advanced countries to just a few years, especially for cases when the progress was not related to large industrial investments. For this reason, in *Železarski Zbornik* it is possible to follow the increased use of knowledge related to the solidification of alloys, the progress in the de-oxidation and de-sulphurisation processing of steels, the evolution of microstructure and properties during hot and cold working, the decrease of energy consumption, the development of analytical and investigation methodology, the improvements in ecology, and other topics, as indicated by the titles of the articles in the issue of the journal giving the bibliography for 40 years of publication. As for the authors, many are distinguished scientists from different fields of research and development, from both Slovenia and abroad. The fact that a number of these authors came from industrial companies is considered a positive attribute and indicates that metallurgy as a science did not separate too much from metallurgy as an industrial technology in Slovenia.

The economic crisis in Yugoslavia was made worse in Slovenia after 1989 because of the loss of traditional markets for industrial products. The politics did not help industry in overcoming the crisis, the amount of research and development in industry was reduced, as was the amount of research in academic institutions. The journal suffered too, principally because of the editor's financial difficulties.

With the change of the journal's name to *Metals Alloys Technologies* in 1992 the first steps towards broadening the contents base were made with the inclusion of topics related to the research and development of the most important engineering materials: metals and alloys, ceramics, polymers and building materials. The journal also included vacuum and surface technologies, and a new publisher was found. The number of members of the editorial board was increased with the association of researchers working in new fields. Gradually, new publishers were also associated and the material base of the publishing was enlarged. The effect of the changes was a sharp increase in the number of authors, the number of manuscripts submitted for publication and the number of topics presented. Another change of name to *Materials and Technology* and a new editorial board were, for this reason, a natural step forward.

After 2000 the official methodology of evaluating the quality of the articles changed significantly with the classification of the journal according to the Science Citation Index (SCI) of the Institute of Scientific Information (ISI), which is based mostly on the scientific merit of the articles. Still today, however, the significance of the articles' findings for the growth of knowledge for technology and the development of new products relevant to Slovenian industry has not been assessed. This probably explains the decline in the number of submitted manuscripts, which still, however, remained above the number of articles printed in other journals edited in Slovenia. Also, the fact that the journal

(Science Citation Index), katerega osnova je pomen objavljenih dosežkov za znanost. Premalo je cenjena vsebinska ocena objave, v kateri bi bila upoštevana tudi vrednost dosežka za rast znanja, ki ga potrebuje slovensko okolje za tehnološko in produktno rast. To je bil verjetno glavni razlog, da se je število objavljenih del postopoma zmanjšalo, vendar se je ohranilo nad številom izvornih del, ki so objavljena v drugih revijah, ki se tiskajo v Sloveniji. Razvrednotena je bila tudi citiranost revije v 15 mednarodnih sekundarnih bazah podatkov, ki po pomenu za razvoj tehnologije in novih materialov ter njihove uporabe v industriji in gradbeništvu gotovo presegajo indeks SCI. Za tega pa celo izdajatelj ISI (Institute of Scientific Informations) iz Filadelfije v ZDA na svoji internetni strani piše, da je več citatov na ožjih raziskovalnih področjih. Inženirskih materialov, ki so osnova sodobne civilizacije, prav gotovo ne moremo uvrstiti med taka, ozka raziskovalno-razvojna področja. Ni dvoma tudi, da je manjša možnost, da bi bila neka znanstvena revija vključena v indeks SCI, če ne izhaja izključno ali pretežno v angleščini, s čimer zanemari enega od temeljnih poslanstev, tj. razvoja znanstvenega in tehniškega izrazoslovja v nacionalnem jeziku. Vendar odločitev o tej dilemi ni stvar uredniške politike, temveč raziskovalne politike države kot celote, ki finančno podpira izdajanje številnih revij. Ne glede na te pomisleke, se je spremenila uredniška politika in v zadnjih letih je delež tiskanih znanstvenih del prevladal nad deležem strokovnih, npr. v letu 2006 je bilo objavljeno 86 % znanstvenih del.

Revija *Materials in tehnologije* je po obsegu in vsebini na nivoju ali celo presega periodične publikacije, ki se tiskajo v Sloveniji. Zato je bil v letu 2005 na seji uredniškega odbora sprejet sklep, da se odpravijo formalne pomanjkljivosti, in da številke izhajajo redno dvomesečno. To je bilo v letniku 2006 uresničeno in ni zadržkov, da ne bi bilo tako tudi naprej. Uredništvo lahko izboljša svoje delo, ne more pa izboljšati vsebine objavljenih del in citiranja revije, oboje je odvisno od avtorjev rokopisov in od članov uredniškega odbora. Zato vabim vse raziskovalce, ki se ukvarjajo z različnimi problemi materialov in problemi povezanimi z materiali, da objavijo svoja dela tudi v reviji *Materials in tehnologije*, in da v njej objavljena dela citirajo v svojih delih, ki so tiskane v drugih državah. Predvsem od njihovega odziva bo odvisna nadaljnja rast kakovosti in ugleda revije ter v njej tiskanih del.

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Glavni urednik
Franc Vodopivec

is cited in 15 international databases which are significant for the development of technology and new products became of secondary importance. It is useful to remember that in the instructions of the ISI, the publisher of the SCI, it is explained that the number of citations is, on average, larger for specialised research fields. It would, of course, be absurd to classify the field of engineering materials, the basis of modern technological civilisation, as specialised. It is probably also the case that there is a smaller possibility for inclusion in the SCI for journals that are not printed mostly, or exclusively, in English. The use of English, however, hinders the realisation of two tasks of the journal: the understanding of the articles by local readers and the development of domestic technical terminology. The answer to both these questions is for the national agency that supports the publication of a number of journals. In spite of these considerations, the publishing policy was changed and the number of scientific articles increased gradually up to a share of 86 % in 2006.

In terms of quality and the number of articles the journal *Materials and Technology* is at the same level or even above that for other periodicals printed in Slovenia. In 2005 the editorial board decided that, gradually, other formal obstacles that are important for inclusion in the SCI should be overcome. In 2006 all the ISI criteria for inclusion in the SCI were fulfilled. The fulfilment of other criteria, for example, the citation of articles printed in *Materials and Technology*, is solely the decision of authors also publishing in international journals. Improving the reputation of the journal depends on the number and the quality of the manuscripts submitted to the journal. For this reason, potential authors are kindly invited to submit manuscripts for publication. The editors and referees will be happy to assist in improving the manuscripts in terms of presentation and language.

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Editor-in-chief
Franc Vodopivec