

巻頭言

“PREFACE”

回 想

Recollection



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「耐火物は理論通りの結果にならない事が多い」。1974年、今で言う「就活」もそれなりにしていましたが、私は就職先を中々決められませんでした。しかし、恩師のこの一言で「これだ！耐火物メーカーへ行こう」と決めました。理論通りにならない、常識が通用しない世界はきっと楽しいに違いない！自分にも何かが出来るかも知れない！と胸躍る気分でした。

翌年、私は品川白煉瓦の守山工場で社会人生を始めました。しかも、恩師が例としてお話しされた粘土、高アルミナ煉瓦を主力製品とする工場への配属でした。また、守山工場は当社が1971年に開発に着手した連続鑄造用パウダーの製造プラントを1974年12月に稼働させたばかりだったのも自分にとっては幸運でした。

“Refractories often show results not consistent with theory”. Those are the words of my university professor. In 1974, I started my job hunting like other university students planning to graduate, but it was difficult to make my career decision. However, those words from my university professor had a great impact on me and were vital in making the final decision. A feeling jumped up inside me, “That’s it!” I thought “I will enter the refractories industry.” I was thrilled with excitement, imagining how enjoyable a world would be, where we cannot get the results according to theory and common sense cannot be applied. I looked forward to what I could do there.

In the following year, 1975, I started my career at Moriyama Works of Shinagawa Refractories Co., Ltd. On top of that, I was assigned to a plant mainly manufacturing clay and high alumina bricks, which my university professor had happened to mention as an example. It was also

守山工場では僅か2年間でしたが、多くの事を経験でき、誠に刺激的でした。ベテランのAさんから粘土質煉瓦を見せられ「耐火度がナンボか分かるか?」。煉瓦を見たことも無い新入社員に何という質問をするのだろうか? 見ただけで分かるのだろうか? 「分かりません」と力なく答えたのを覚えています。また、別のある日「野村君、君は煉瓦と話が出来るのか?」とも。これまた、無茶な質問です。「使用後煉瓦をじっと見てみるとね、その内に話が出来るようになるんだよ」「どういう条件で使われ、その結果、こうなりましたと煉瓦が教えてくれるんだよ」と。「本当に?」今もこのやりとりを懐かしく思い出します。

その後、技術研究所へ配属となり、25年間の研究開発時代を過ごしました。守山工場でのAさんのアドバイスを片時も忘れず過ごした、楽しく、充実した25年でした。その間、多くの品川人、お客様と親しく接することが出来たことは本当に有難く、紙面をお借りして心からお礼を申し上げます。紙面に限りがありますが、思いつくままにお客様との思い出を書いてみます。1977年から私は連続鑄造用パウダーの開発に携わりましたが、当時は教科書的な物は無く、旧ソ連の文献や特許、鉄鋼各社からのレポートが貴重な情報源でした。ある日、鉄鋼メーカーのBさんから「この文献は中炭素鋼の割れ防止用のパウダーの開発に役立つかもしれないよ」と渡されたのがUSスチール研究所の論文でした。それは鋼中カーボンの凝固シェルの成長に及ぼす影響に関する実験結果でした。鋼の凝固の勉強なんてとんでもないと思ったのですが、内容

fortunate for me that Moriyama Works had just started the plant manufacturing mold powders for continuous casting in December 1974. Our company undertook the development of mold powders in 1971.

At Moriyama Works, I worked for only two years, but I could experience a lot of things. It was very stimulating. Mr. A, an experienced member, showed me a clay brick and asked me, "Do you know the refractoriness of this brick?" I wondered why he asked a new recruit who had never seen refractory bricks such a question and if he could tell just by looking. I remember answering helplessly, "I don't know." Another day, he also asked me, "Can you talk with bricks?" This was also a question impossible to answer. He told me, "If you stare at bricks after use intently, you will come to be able to talk with them. They tell us under what circumstances they were used and how they have become like this as a result." "Really?" I answered. I still recall this conversation with fondness.

I was then assigned to the Research Center and engaged in research and development for 25 years. It was a pleasant and fulfilling 25 years that I spent, not forgetting Mr. A's advice even for a moment. I appreciate that I could have a friendly association with a lot of Shinagawa people and customers during this time. Taking this opportunity, I would like to thank all of them. There isn't enough space in this preface, but let me write down whatever comes to my mind about the memory of the customers.

From 1977, I was engaged in the development of mold powders for continuous casting, but there were no established theories or literature. The valuable sources were former Soviet Union's papers and patents, and reports from each steel company. One day, Mr. B of one steel company handed me a paper by US Steel Research and Technology, saying it might be helpful for the development of mold powders for preventing cracks

は実に面白く、Bさんの言われた通り、その後の中炭素鋼用パウダーの開発に大いに役立ちました。あの文献に出会えなかったら、当社は世界に誇る中炭素鋼用パウダーを生み出すことは出来なかったかもしれません。

「something new」。パウダーの技術説明に訪れた時、お客様であるCさんは打ち合わせ室に入るや否や、無言のまま黒板に向かい、白いチョークで大きな文字でくっきりと書かれました。そして、「something new! 常識の範囲内にある技術には興味は無いよ」と言われたのです。いきなりのお言葉でしたが、非常に嬉しかったことを覚えています。お客様もそれまでにない、常識の範囲外の技術に興味をお持ちであり、自分もこれまで通り「something new」を追い求めれば良いんだと思ったのです。今もこの考えは全く変わりません。機会があれば当社の「something new」をお伝えしたいと強く願っております。

パウダーの開発担当は15年の長きにわたりましたが、その後、定形耐火物の担当となりました。ある時、大学主催のセミナーに出席する機会を得、泊まり込みで参加しました。幸運にも夕食会で鉄鋼メーカーの研究所長であるDさんと同席となり、貴重なお話を伺う事が出来ました。速やかに問題解決する方法についてのお話しでした。研究者には二通りある。一つは単独で問題解決しようとするタイプ。もう一つは問題を周りの人間に伝え、議論し、解決しようとするタイプ。もちろん後者のタイプが良いとの結論でした。印象に残ったのはこの結論ではなく、「議論を繰り返す内に、誰が言い出した意見

in medium carbon steel. This paper described the experimental result regarding the influence that carbon in the steel had on the growth of the solidified shell in a mold. I first thought the study of the solidified shell was not my business, but that paper was very interesting in any case and it has been extremely helpful in the development of mold powders for medium carbon steel since then just as Mr. B told me it would be. Without an encounter with that paper, our company could not have developed our world-class mold powders for medium carbon steel.

“Something new”. Our customer, Mr. C., headed toward the blackboard without saying a word as soon as he entered the meeting room when I visited him to make a technical explanation on mold powders, and wrote this word clearly in large letters with a piece of white chalk. He then said, “Something new! I am not interested in the technology which exists within the bounds of common sense.” It was a sudden remark, but I remember that I felt very happy. Knowing that our customer was also interested in the technology which had never existed and went beyond common sense, I thought I had to pursue “something new” as before. This idea remains unchanged in me now. If there is a chance, I strongly hope to introduce “something new” from our company to him.

I was engaged in the development of mold powders for as long as 15 years. I then took charge of shaped refractories. One day, I had a chance to participate in a seminar hosted by a university and stayed overnight. Fortunately, I shared a table at dinner with Mr. D, head of the research institute of a steel company, and could hear his valuable insight. He described a method for solving problems quickly: there are two types of researchers, one is the type who tries to solve problems independently, and the other is the type who tries to solve problems by communicating the problem to people around them and having a discussion with them. Of course the conclusion

なのか分からない状態になる。それが理想だ。」とおっしゃったことです。このことは組織で問題解決する時の最も重要なノウハウとして今も心に止めています。

私は研究活動も営業活動も個の力を優先すべきであり、管理することは進歩の妨げになることもあると思っています。さらに、上下関係や経歴を超えた意見交換、コミュニケーションが無ければ個の力は生み出せない、成長も無いともっています。研究所時代に多くの製品開発に接してきましたが100%個人のアイデアで製品化までたどり着いたことは無かったと思います。誰かと立ち話をしている時、人の議論を聞いていた時、部外者と世間話をしていた時などに開発のヒントを得ていたような気がします。黙って、一人で、眉間にしわを寄せてでは研究開発は無理です。少なくとも企業で求められるスピード感はあり得ないと思います。

最近、面白い新聞記事を見ました。日本は男女とも長寿大国ですが、世界一の長寿企業大国でもあるとのこと。100年以上の長寿企業は世界に約4万社あり、その内、日本には2万788社もあるそうです。我が社も140年近くの歴史がありますが、存続するにはいくつかの理由があったと思います。その内の一つは技術開発力だと思っています。日本は技術開発力で生き延びてきた国であることを忘れてはいけませんし、当社も技術開発力の裏付けがあつての現状であると信じています。

ところで、大多数の耐火物技術者が改良をあきらめていた、投げ出していたMgO-C煉瓦で当社がこの数年間で大きな成果を出したのは驚

was that the latter was good. What impressed me was not this point, but what he said at that time: "If discussions are repeated, we find ourselves in a situation where we don't recognize who that idea originated with. It is an ideal status." I still bear these words in mind as the most important know-how in solving problems within an organization.

In my opinion, we should give priority to an individuals' abilities in both research and sales activities, and controlling them sometimes impedes progress; furthermore, without an exchange of opinions and communication which go beyond the hierarchical relationship and each person's background, an individuals' strengths cannot be elicited, and growth cannot be achieved. During the time at Research Center, I was involved in the development of a number of products, but no products could have been commercialized with a 100% individual's idea. Hints seem to have been given when I stood talking to someone, heard others having a discussion, or had a small talk with outsiders. It is difficult for individuals who work alone silently with their brows furrowed to carry out research and development. At least it seems impossible for them to achieve the speed required for companies.

Recently I saw an interesting newspaper article. While Japan is a country with a long life expectancy of both males and females, it is the country having the highest number of companies with long histories in the world. There are more than 40,000 companies having a history of more than 100 years in the world, of which 20,788 companies are located in Japan. Our company has a history of nearly 140 years. There seems to have been some reasons for its survival. One of the reasons is thought to be the capacity for technological development. We must not forget that Japan has been surviving with technological development. With this backup, I believe, our company also exists as it is today.

In the meantime, it is surprising that we have

きであり、多くの研究者を勇気づけたと思います。新規に開発されたMgO-C煉瓦によって転炉では損傷速度が半減し、電気炉激食部では寿命が4倍になりました。これはまぎれもない事実です。MgO-Cは改良の余地がないと世界の誰もが言っていたはずなのにです。私もかつてMgO-C煉瓦の担当をしており、アイデアが出せなかった自分を大いに恥じるとともに、この開発に関わった全ての人達に称賛の拍手を送りたいと思います。

「耐火物は理論通りの結果にならない事が多い」のは今も昔も変わりません。次の世代を担う若手技術者の皆さん、耐火物の世界はやるべきこと、やれることが山ほどあります。素直に、正直に耐火物に向かえばきっと新しい世界が見えてきます。過去の文献を読む、先輩の話を良く聞くことも大事でしょうが、自分で感じることをもっと大事にすべきだと思います。学んだことで新技術をひねり出そうなんて考えてはいけません。理屈を事実より優先してはいけません。自分の正直な考えを耐火物にぶつければ耐火物から何かの反応があるかもしれません。ひょっとしたら耐火物と会話が出来るようになるかもしれません。

最後に連続鑄造用パウダーについて一言。私も15年間精一杯頑張ったつもりです。その後20年が経過し、現在の当社のパウダー技術は我々世代から見れば別世界です。例えば「塩基度 CaO/SiO_2 は1.0付近が妥当」でしたが、現在は「塩基度は0.3～3.0の範囲が常識」となっています。当社がパウダーの開発を始めて約40年が経過しましたが、現在も技術は確実に進歩してい

achieved remarkable results over the past few years in the improvement of MgO-C brick which most of the refractory engineers had given up and abandoned. I believe that this has encouraged a lot of researchers. With this newly-developed MgO-C brick, the wear speed in BOFs halved and the life in the high wear areas of EAFs quadrupled. This is an obvious fact, although everyone in the world said there was no room for improvement in the development of MgO-C brick. As I was involved in the development of MgO-C brick once, I feel ashamed of myself for having failed to come up with the ideas, and at the same time, I would like to applaud all the people involved with this development.

The fact that “Refractories often show results not consistent with theory” remains the same. I would like to say to everyone of the young engineers responsible for the next generation that there seems to be a mountain of things that should be done and that can be done in the world of refractories. If you face refractories genuinely and honestly, you can see a new world. It is important to read past literature and listen to what seniors say carefully, but I think you should put the most emphasis on what you yourself feel. You should not try to squeeze out new technology with what you have learned. You should not prioritize theory over fact. You may get some reaction from refractories if you face them with your own honest ideas. Perhaps you can come to be able to have a conversation with refractories.

Finally, let me say a word about mold powders for continuous casting. I also intended to give my best effort for those 15 years. 20 years have passed since then. Looking from our generation's viewpoint, the present mold powder technology of our company lies in another world. For instance, a basicity, CaO/SiO_2 , of around 1.0 was appropriate in those days, but the basicity ranging from 0.3 to 3.0 is normal today. It has been about 40 years since we undertook the development of mold

ます。実に喜ばしい、素晴らしいことだと思います。

これからも品川は耐火物のあらゆる分野で世界をリードする技術開発を推進していかなければなりません。次の世代の皆さんがこの使命を果たされることを深く願っています。

powders. Without doubt, its technology is still progressing. How wonderful and amazing it is.

Shinagawa Refractories should continue to carry forward the technological development which leads the world in every aspect of refractories. I sincerely hope that everyone in the next generation will accomplish this mission.