The concept of cladding a backing steel with a corrosion or erosion-resistant alloy has been around for many years. Lack of availability and technical difficulties caused by the unfamiliarity of most engineers with clad piping materials have often made clad products difficult to use and have prevented the option from being accepted as an easy solution to a plant engineer’s corrosion or erosion problem. The lack of availability of fittings has been an especially serious barrier to the effective use of clad piping products. But times have changed: KLAD LLP, based in Houston, USA, has dedicated itself to making clad piping easier to obtain and projects using the material easier to execute.

Stainless Steel World spoke to President & Technical Director Dr Bhaven Chakravarti, VP Sales & Marketing Mr Robert Jenkerson and VP Manufacturing Mr Keith Oliver. We visited their facilities to hear more about the company that is dedicated to making clad materials a generally excepted third option in piping products next to carbon steels and high alloy materials.

“KLAD started in 1990 from a necessity that came about at that time,” Dr Chakravarti says. “The US nuclear power industry was then faced with flow-accelerated corrosion (FAC) that corroded the carbon-steel pipes. In fact there were a number of accidents here in the US where people were severely injured as a result of FAC. So there was an urgent demand to replace the carbon-steel pipes with a corrosion-resistant material that would solve the problem. Stainless seemed to be the obvious choice, but this would have called for significant redesign of the plants, which was expensive and complicated. So I suggested the idea of using...
clad to the engineering company that I worked for at the time. By selecting clad materials as the material of choice the combination of corrosion resistance and mechanical strength would be satisfied at the same time. All in all it turned out to be a highly effective solution both from the corrosion and the economic points of view,” Dr Chakravarti says. He adds, “From that start KLAID has extended the applications of clad piping systems to the refinery, oil and gas production and other plants applications, providing numerous economical and technical advantages over present materials.”

Mr Jenkerson explains, “Our products have been highly successful in improving performance and life expectancy in the refineries for crude tower overhead lines, vacuum tower transfer lines, high pressure reactor effluent and air cooler effluent lines and other such lines that condenses corrosive fluid. The material advantages are obvious to the refineries and other plants; the real challenge has been explaining there are no struggles procuring the entire piping system because of the structure KLAID has created. KLAID is most certainly an exception to the generally low-cost criteria. This is the essence of the KLAID method, which KLAID management believes to be unique. KLAID is most certainly an exception to the generally low-cost criteria. This is the essence of the KLAID method, which KLAID management believes to be unique. GOAL One of KLAID’s primary goals is to emphasize to the materials community the cost advantages of clad. Mr Jenkerson says, “Compared to clad products other materials tend to have higher costs. Lower alloys such as carbon steel require more maintenance and continuous monitoring, while stainless steels and higher alloys have huge up-front costs. Clad products will in most cases be the real economic choice, as they have the lowest ownership costs, satisfy the initial budget and require little maintenance and no monitoring. We feel it is a big gain for operators, metallurgists and plant management alike.”

Unfamiliarity with clad products on the part of corrosion professionals and problems with sourcing the materials meant KLAID had to start from scratch when developing its markets. Dr Chakravarti: “We’ve followed an industry-by-industry application approach and most of our work is the result of solving specific problems. We develop a solution and convince the materials people of the effectiveness of the clad option. They are usually the first to realise the benefit of clad products, after which they become the prime movers for considering clad for any project that comes about. When an actual project is being considered it is up to us again to convince the project and procurement people of the viability of the concept. In fact it’s not so much a difficult way to do business as it is a long one. We have to make a long-term commitment to execute all stages of a particular job.”

An example of an application that KLAID is now focusing on is Oil and Gas production, where the potential for clad is considerable. Clad products offer substantial potential both in solving corrosion problems and in meeting mechanical requirements. For this application metallurgically bond clad products are often the material of choice and KLAID is particularly involved in supplying products for critical service areas such as manifolds and risers where metallurgically bonded products provide the integrity needed. Dr Chakravarti expects that the refining, oil and gas, nuclear power and other industrial applications to continue; fields in which KLAID has already proven itself. Even so, the priority now lies in spreading the word about clad. As Dr Chakravarti says, “In the past few years we’ve been focusing on the techniques and technologies to produce an effective product and have developed competitive solutions for a wide range of applications. The time has now come for us to focus on the marketing end of things and show the world all that clad has to offer.”