

## **Without mechanization there will be no quality**

*As is well known, starting from this year Zaporizhstal JSC is working in conditions, which conform to the international quality standard ISO, series 9000, therefore, its product corresponds to all the requirements, not only on quality, but also on packing. If earlier we were not able to present the goods in a favourable, and attractive packing, now times have changed. Products ready for shipment are not worse in appearance, than their import analogues.*

Today the products of Zaporizhstal, ready for shipment, please an eye. Coils of metal are wrapped up in special paper with a film covering. Packets of sheets are stacked on pallets made of qualitative wooden beams, edged with metal angles with straight even corners, strongly strapped with a packing strip. Brand labels are printed on self-adhesive paper. Both coils and packets have a good anticorrosive protection, decent shockproof properties and an attractive marketable state.

They look just as attractive after stacking them in railway wagons because all the packing elements remain whole and undamaged. Neither the wooden beams, nor the packing metal sheets, nor the packing strip get damaged.

Not only the rollers are proud of their products but also the chief of the central laboratory of automation and mechanization of the Works, Yuriy Pavlovich Sopilnyak. Here is his story.

If we look back, approximately into the 60-ties –70-ties, and we compare the type and the quality of commercial goods of Zaporizhstal JSC of those years and those of today, we shall see dramatic changes. It is possible to speak of a technical revolution on sheet processing and loading of finished products, which have provided the possibility of retaining the quality of the sheet products at all stages of the technological process.

### **- Wherewith were such results achieved?**

Naturally, a lot of measures were taken, both technical, and organizational ones. But I want to cover the technical measures at our

Works. In my opinion, they are the most important ones included in the program on perfection of equipment and technology of the packing process of finished products.

Owing to its solution, it has become possible to retain the quality of the products even after the last technological operation, i.e. loading into railway wagons, speed up the work of the crane, reduce loading time, lighten the work of the workers working under the crane, improve the safety work conditions at all the technological stages. The question is in the construction of special load-lifting facilities for technological transportation of packets of sheets in the shop and their loading into railway and motor transport.

At first, a bit of history. The problem of guaranteeing quality of Zaporizhstal packing of sheet products has always been of current importance. Especially it concerned packets of cold-rolled sheets. Trials with claims and complaints were a usual thing. Discussions on the subject of packing quality frequently took place at different administrative levels. Improvement of this or that was being continuously discussed. Qualitative wood was demanded from the suppliers, the beam section was increased, the possibility for replacing wooden beams with metal angles was analysed, more thick packing material was used, etc. Unfortunately, all these measures did not give any positive result. Though the packing process was concentrated on packing conveyors and packing was done with the help of manual pneumatic packing machines and special technological devices, the packets on the outlet of the conveyor still looked rather decent. But the packing elements lost their marketable state and technological purpose after further transportation of the packets to the warehouse and their loading in railway wagons. It is better not to recall what a packet looked like before it was loaded into railway wagons or trucks. The customers continuously complained about the quality of the received rolled products.

The analysis of the technology of the delivery of the packets from the packing conveyor up to the railway wagon, done by our laboratory, has shown, that the main initiators of damaging the packing of the packets and the enclosed sheets are the means of delivery and loading. First of all, it is the use of general-purpose electric bridge cranes instead of special ones, with their relatively low rated load capacity and their out-of-date design,

and also the usage of chain and rope slings. Hence, it was necessary to construct and improve transport delivery and loading devices, especially for sheet packets.

This became the goal of the Central Laboratory of Automation and Mechanization of the Works. The first significant solution was the construction of a special spreader with an electric drive and button control. The result of its introduction was felt at once. With the help of these spreaders the packets of sheets, when transported from the packet pilers of the shearing units to the packing conveyors and from the conveyors to the warehouse of finished products, did not lose their shape, and their packing was not damaged. At this stage different types of spreaders were constructed to transport packets of cold-rolled and hot-rolled sheets of different size and length. They operated both in the hot-strip rolling mill shop and cold-rolling mill shop No.1.

However, these spreaders did not completely solve the problem of preventing the packets from getting damaged. The following loading of the packets into railway wagons with the help of slings, still deformed their metal packing, broke the wooden beams, tore the packing strip, and the sheets in the packets became bent and crushed. The attempt to construct, on the base of the spreader with an electric drive, a special one for loading operations has been unsuccessful because these spreaders could not provide tight (theoretically without any gaps) placing of packets in a railway car. Apart from that the presence of electric bridge cranes of an old design with one block suspension, the usage of cable connection between the spreader and the block suspension on the loading manifold made this operation unstable. Periodically the spreader started rotating relatively to the suspension axle, leading to tearing of the cable.

At this time all the metallurgical enterprises of the former Soviet Union at various times and with a different share of efficiency were in the search for constructing equipment to mechanize the loading operations, facilitating and making the process safe, and, first of all, providing the packets with a marketable state, retaining the quality of the packets, and, hence, the products.

The cold-rolling shop of Ilyich Works (Mariupol) also worked on the design of a spreader with an electric drive. At Novolipetsk Metallurgical Works a special driveless grip for loading hot-rolled sheets with rated load

capacity 10 tons was designed and put into operation. It worked in cycles in an automatic mode, which, however, was not adapted to work with packets stacked in a pile.

The ability of this grip to work without a drive, i.e. automatically, on any crane suspension became that base idea, on the basis of which, a new family of specialized load-lifting devices was born.

The first grips with rated load capacity of 15 tons, which were designed by the laboratory of mechanization of rolling production of the Central Laboratory on Automation and Mechanization, especially for the hot-strip rolling shop, differed from the prototype by the novelty of their technical decisions. They fully complied with the industrial conditions of the shop. In this shop they quickly replaced the electric spreaders. The electric bridge crane operators using the ability of the grips to work automatically, have mastered the removal of the packets from the pilers of the shearing unit, stacking them on platforms and in piles at the warehouse of finished products, without the interference of workers. . Loading into prepared railway wagons was also done in the absence of a worker inside the wagon. This equipment deprived the workers of using slings, quickly got acclimatized and became part-and-parcel of the technological and loading process.

However, for thin cold-rolled metal, these grips were unsuitable. The creation of a more perfect design of the following generation of grips, universal for packets of cold-rolled metal, needed one more original decision, a carriage with a so-called, folding grip. Not going deeply into the design of such a grip, I want to say, that the stretching or weakening of load carrying chains operate not only the moving carriage, but also the grips - to hold the load or release it. One more advantage of this model is non-failure operation during any unpredicted situation, especially in the railway wagon.

At present all the rolling mill shops are equipped with grips of such a design developed by experts of the Works, protected by two inventor's certificates of the former USSR and the patent of Ukraine.

Taking into account the received result, it is safe to say, that these particularized transport and loading devices are those technical means which have become the determining factor in the complex measures on maintaining high quality of commercial output of Zaporizhstal Works.

