

## USE OF FLAT CARBON STEEL FOR INDUSTRY

A steel grade should fulfil two major demands : provide the end products its functionality and agree with the processing at the customer. The choice of the steel grade and its further specifications should meet these demands. Steels are widely used in all main manufacturing sectors. These are the transport industry, the building industry, the packaging sector, the domestic appliances industry and general engineering. Typical applications in these areas are :

- Automotive and transport: cars, vans, trucks, railroad transport and shipbuilding
- Building : industrial buildings and home building
- Packaging : cans, tins, drums, containers
- » Domestic appliances : refrigerators, washing machines, stoves and microwave ovens
- « Engineering : process equipment for the chemical and oil industry, tubes and parts

### Mechanical construction and engineering

Due to its mechanical properties, steel has virtually always ruled the field of mechanical engineering. It satisfies a wide range of requirements. Its uniquely rich metallurgy, and the skill with which the steel makers and many of their customers take advantage of it, make it possible to obtain an extremely large diversity of functional characteristics. Properties such as yield and tensile strengths, ductility, fatigue strength, abrasion resistance, weldability, formability, etc., can be varied in apparently infinite combinations.

Mobile cranes, for example, offer an illustration of the interest of high strength steels. For a given lifting capacity, thinner sections mean less metal and lower costs. However, here again, total weight is an essential factor. The same reasoning applies to truck trailers. A lighter structure means a higher payload. Furthermore, a trailer must be easy to repair, and the weldability of steel is an essential feature. Another example among the many applications of high strength steels is their use in pipelines, in order to reduce the wall thickness.

For the same pumping pressure and bursting strength, the weight savings significantly decrease capital expenditure.

Corrosion can also be a constraint in mechanical engineering. Steel components, even with thick sections for supporting heavy loads, must be protected against attack by the natural environment or by chemical substances with which their function brings them into contact. The traditional solution used to be galvanisation, followed by painting of the finished part. Nowadays, wide hot-rolled steel strip several millimetres thick is galvanised directly in the steel mills. Under certain conditions, corrosion of uncoated edges and welds is prevented by "cathodic protection", so that in the majority of cases subsequent coating with zinc is not necessary. Liquefied natural gas tanks is one of the applications that have gained from progress in corrosion protection.

### Automotive

The steel itself shapes the automobile, inspiring its forms and encasing its mechanisms, while protecting its passengers from the weather, noise, and most importantly, from the danger of accidents.

The history of the motor vehicle is inseparable from that of steel, and has led to today's close partnership between the automobile manufacturer and the steel maker. Continuous progress in vehicle performance has required parallel improvements in materials. The development of new grades is dictated mainly by the demands of this industry for materials that will make the production of lightweight, fuel-efficient cars, possible in a cost-effective manner.

Automobile design principles in fact reflect the properties of the material. They provide the toughness, strength and structural integrity necessary for passenger safety, while at the same time complying with increasing demands for aesthetic appearance and durability.

The proportion of steel used in housing ( $\pm 2\%$ ) is quite different from that employed in industrial buildings ( $\pm 50\%$ ). However, whenever functional arguments prevail over emotional reasoning, the mechanical qualities of steel win the day. Thus, the possibility of very wide spans is extensively exploited in factories, warehouses, agricultural buildings, sports facilities and shopping centres. Steel is not only the rational choice, but is also synonymous with bold design. It enables a lighter, more airy style. Less restricted by weight, and with the possibility of tensile loading, architects can make full use of cantilever designs and non-vertical contours.

aggressive chemicals, as in washing machines, enamel-coated or stainless steels meet the challenge. New steel grades now greatly facilitate the enamelling process, simplifying surface preparation and reducing the number of layers and baking treatments required.

When low cost is essential, paint finishes are employed. In this case, the sheet can be coilcoated in the plant after galvanising, and then cut to shape, formed and assembled. Modern galvanised and painted products offer remarkable flexibility and attractive appearance, combined with resistance to all types of foodstuffs and cleaning agents, e.g. detergents, disinfectants, vinegar, wine, ... Their resistance to ageing and high temperatures has become excellent.

In cooking appliances, numerous structural components are subjected to very high temperatures, exceeding 500°C in pyrolytic self-cleaning ovens. Only enamelled products can withstand these conditions, and are universally employed in gas-burning or electrically heated hobs.

points“

Steels are widely used in all main manufacturing sectors:

- General engineering (Due to its mechanical properties)
- Transport industry (The steel itself shapes the automobile)
- Building industry (The high mechanical strength makes it possible to obtain lighter and stiffer structures, with longer spans)
- Packaging sector (Easy and cheap to recycle)
- Domestic appliances industry (Cheaper, flexible, universal)

English	Czech
Bursting strength	Pevnost v protlačení
Cantilever	Převislý konec
Capital expenditure	Investiční výdaje
Payload	Užitečné zatížení (vozidla)
Pipeline	Potrubí
Pumping pressure	Čerpací tlak
Pyrolyze	Štěpit teplem
Tensile loading	Zatížení v tahu
Truck trailers	Nákladní přívěs