

# Technical principles

## General

Carbide coating is used to reinforce components that are exposed to extreme loads. The coating is applied using various techniques, depending on the nature of the component. Mølbro uses three different techniques.

In order to explain what a carbide coating consists of, you need to imagine glue mixed together with a lot of small stones. The glue is called rock matrix and is either made of steel or nickel. The choice of material depends on the production method used. The stones consist of different carbides such as Wolfram or Niobium. The carbides vary in size and hardness and are mixed together with the glue as required. Thus, there are for example many Wolfram carbides in a coating for plough points as Wolfram carbides are very hard and plough points are subjected to extreme loads.

## Unique Mølbro technology

Within coating, no known products can match Mølbro's technology. Mølbro has developed a technology where the rock matrix combines with the component to which the coating is applied. The result is a product where the risk of coating fall-off is eliminated. Another benefit is that the carbides and the matrix combine with the component, making it extremely strong.

This is possible in all three production methods thanks to Mølbros unique technology.

## The three production methods

1) A 6-axis robot applies a steel pipe wire (rock matrix) filled with carbide powder to the component. This production method is used within agriculture for subsoiler parts subjected to extreme conditions, but it could also be used within the stone-working industry.

2) A welding wire with a nickel core surrounded by carbides.

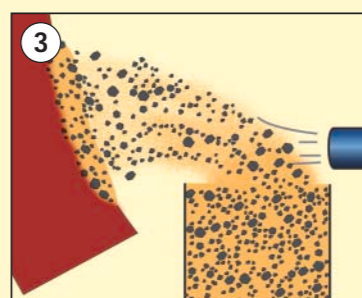
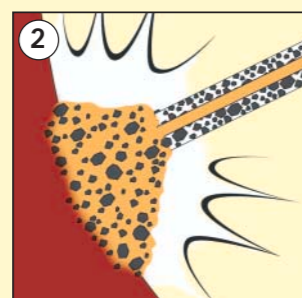
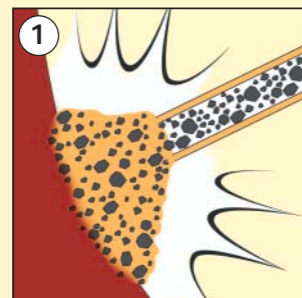
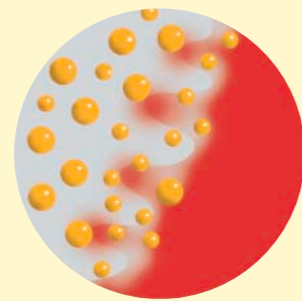
3) A powder containing carbides and rock matrix (nickel) is spray-applied thermally. This production method is used for components such as wings, shares and rotor blades.

This production method is used for plough points, ploughshares and wings subject to extreme wear and tear.

## Hardness and hardening

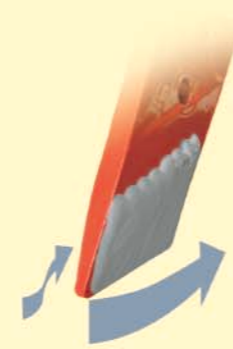
The hardness is determined by the carbide composition. The carbide types mixed into the coating thus depend on the component onto which they are to be applied.

As a unique feature, the components are not hardened until after the coating has been applied. The result is a very homogenous product with a very long service life.



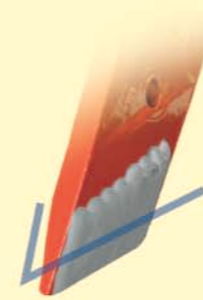
# Example of the effect of the coating

We will take a well-known Mølbro product, the carbide-coated EUROPOINT™, as an example to illustrate the potential benefits of a coating when applied appropriately using the correct technology.



The coating on EUROPOINT™ is applied on the back of the point, which is exposed to maximum wear.

The point carries the entire weight of the plough and wear by the soil is at its maximum at the exact point where Mølbro has placed the reinforcement.

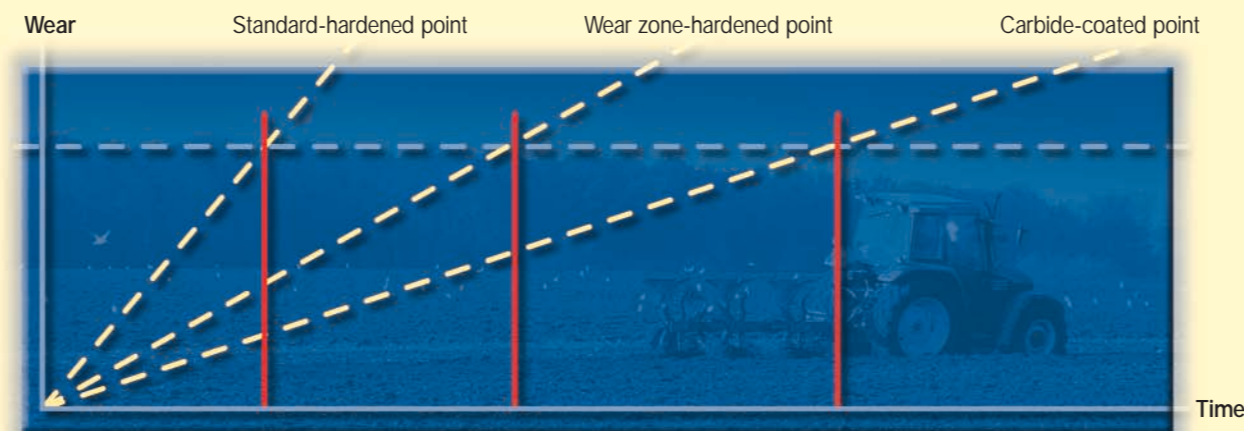


Using good judgment and a good design you can take advantage of this wear. A EUROPOINT™ is self-sharpening because the ploughshare is worn faster on the front than on the back.

This results in decreased traction consumption and a reduced risk of soil compaction caused by blunt points.



Mølbro's unique technology ensures that the coating is always the last element left on the point instead of falling off as the first. The strong fusion of the component and the rock matrix ensures that the coating always remains in place, prolonging the point life to the maximum.



The figure clearly illustrates that the carbide coating prolongs the life of a plough point significantly. Under normal soil conditions up to three to four times compared to a standard-hardened point.

# About Mølbro's products

## The Mølbro durability is a combination of many technologies.

The unique combination of specially selected steel, drop-forging, hardening method, carbide coating and design makes the Mølbro's product line very attractive.

The steel used in Mølbro products is ore-based steel, the purest steel type available.

We use drop-forging for the parts which are subjected to the most wear and tear. The parts are drop-forged under extremely high pres

sure. Drop-forging increases the strength of the steel, as it improves the material's fine microstructure.

Mølbro applies well-known hardening methods that have been developed over several decades, and this technological development has added a significant number of hours to product durability.

Mølbro product design always focuses on optimum functionality.

# A wide range of applications

Within the agricultural sector, Mølbro develops products for the primary and secondary production methods. However, we are currently working to develop more products for reduced soil cultivation within the low-till and no-till areas.

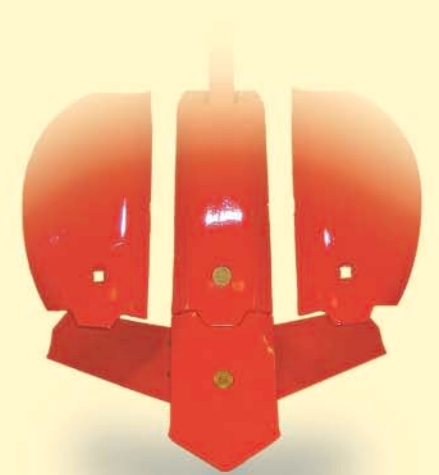
Here are some examples:

## Agriculture

Plough parts  
Subsoiler parts  
Wings  
Drums  
Harrow parts  
Seeders  
Combine harvester parts  
Discs

## Forestry

The cement industry  
The meat processing industry  
The stone-working industry and contractor equipment



# Consistent quality



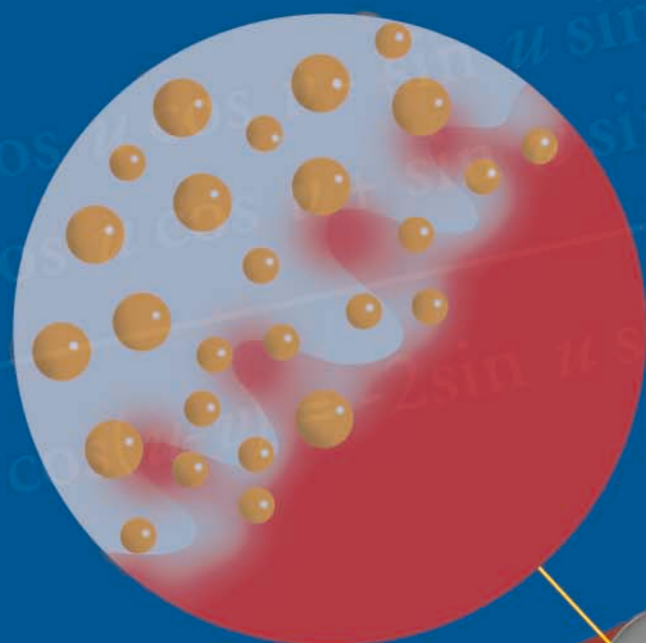
Production at Mølbro is increasingly automated.

This is to ensure consistent quality. Once you have bought a high-quality product from Mølbro, you can thus rest assured that your next purchase will have the same high quality.

At Mølbro, we are constantly developing and renewing our production facilities. This strategy means that our prices are always competitive.



UNIQUE MØLBRO  
TECHNOLOGY



# CARBIDE COATING

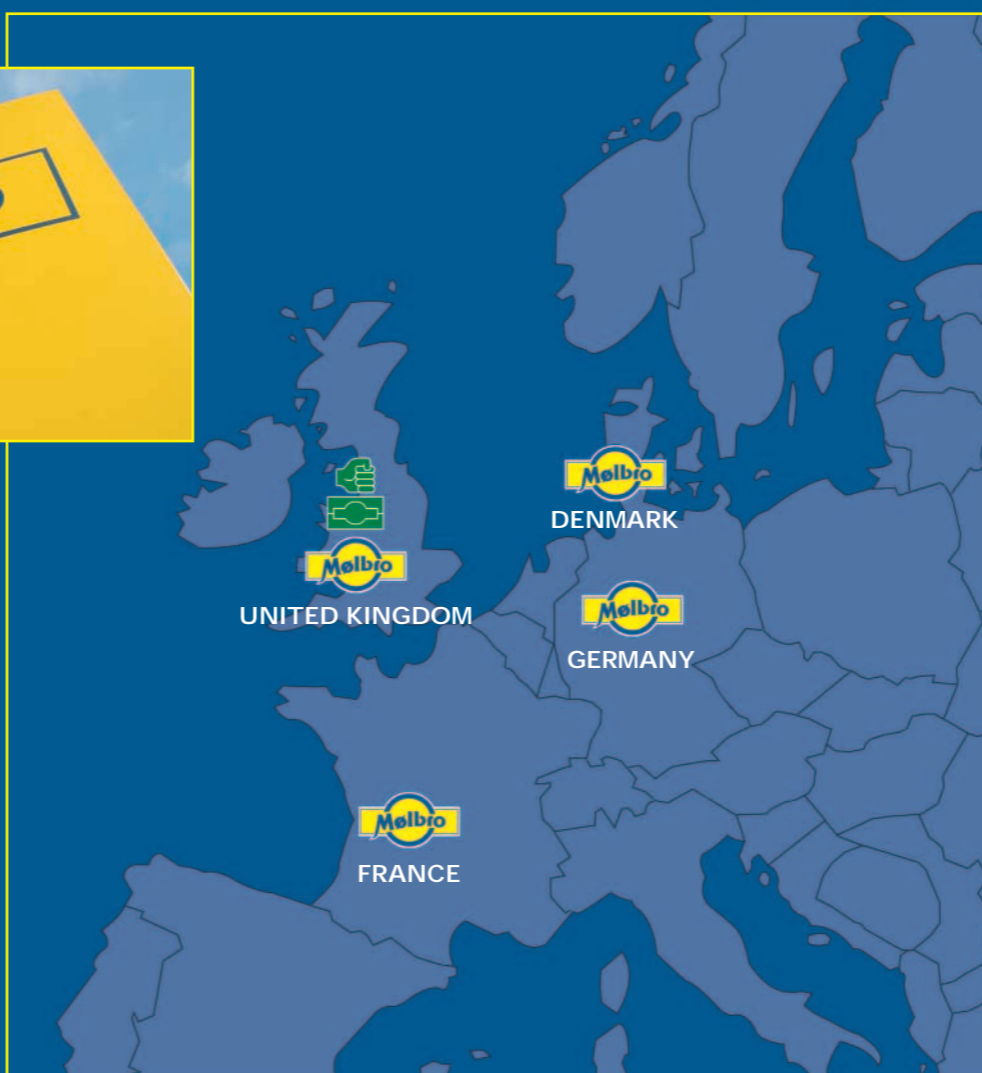


## EUROPE

Head office:  
Denmark

Sales offices:  
France  
Germany

Molbro Forgings Ltd.  
United Kingdom



Molbro Forgings Ltd.

This is Molbro's drop-forging enterprise,  
situated in Cradley Heath, near Birmingham, UK.

This plant produces all the parts for Molbro's  
product range as well as many other products  
for other industries.



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