

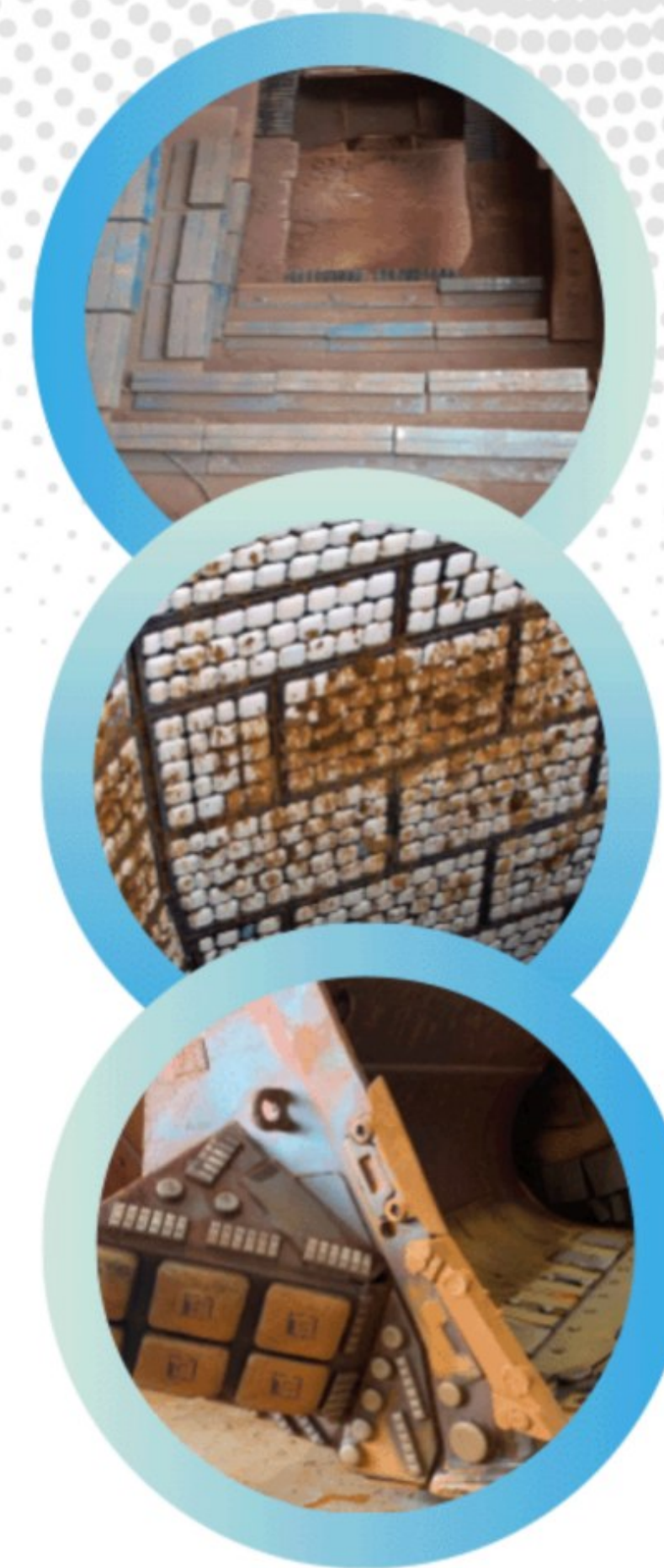


TE **TECKNO**
ALLOYS

» THE COMPANY

Founded in 2015, **Teckno-Alloys** operates in the market for solutions against the main wear phenomena caused by abrasion and impact. We serve the mining, steelmaking, cement, sugar and ethanol, railway, and agribusiness sectors with exclusive, customized solutions aimed at the best cost-benefit ratio, providing greater safety for our people.

Teckno-Alloys offers a product line with high resistance to wear, abrasion and impact. Our main products are: **tungsten carbide inserts with 85 HRC hardness, Chocky Bar with uniform hardness of 700 HB, chromium carbide overlay plates with minimum hardness of 58 HRC and maximum of 68 HRC, rolled plates with 400/450/500 and 600 HB hardness, and 92 to 98% alumina ceramic plates.**





» TECKNO-ALLOYS PHILOSOPHY

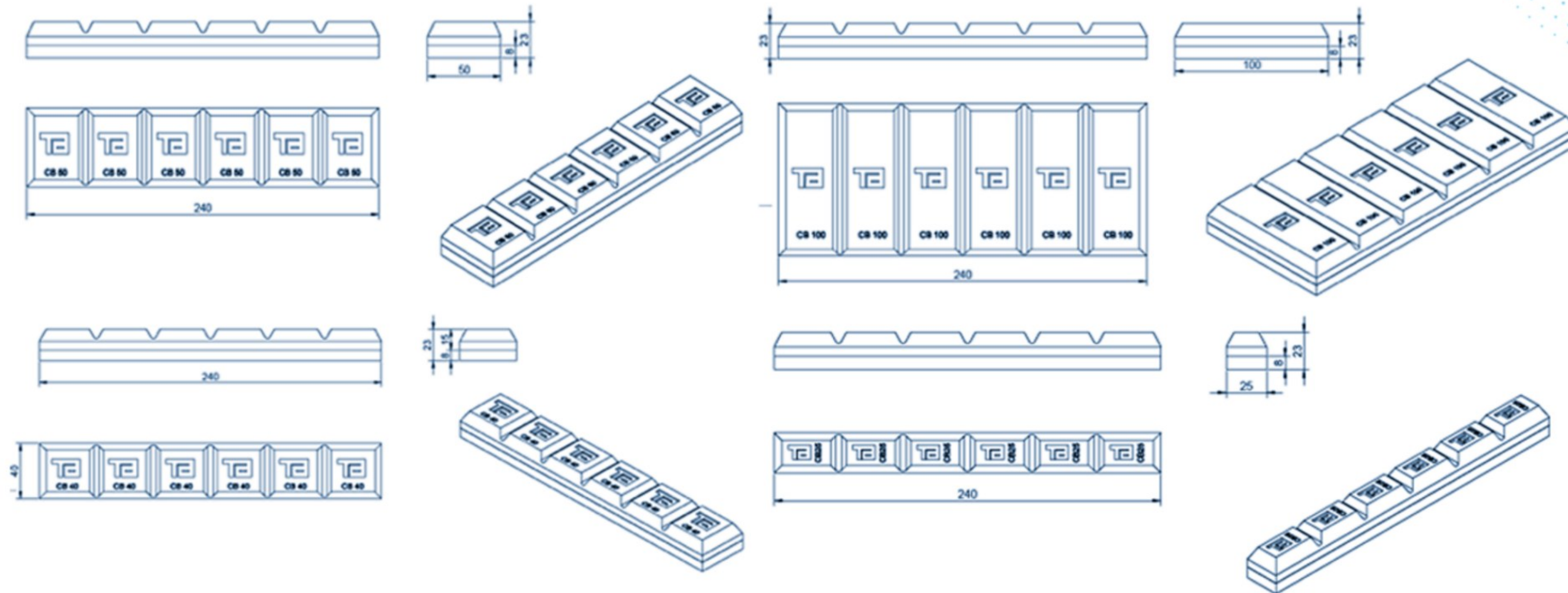
Our philosophy is to **improve overlays** across diverse market segments, aiming to bring our clients the best possible availability at the lowest possible cost, ensuring greater safety, respect for the environment, and conservation of non-renewable mineral resources.

TECKNO-ALLOYS operates in the market for solutions against the main wear phenomena found in industry, which cost thousands of dollars annually in parts replacement and spares. Our proposal is to develop, tirelessly improve, and apply true, high-quality solutions, and to become a market reference in **Wear Solutions**.

» TECKNO-ALLOYS SOLUTION
CHOCKY BAR

» TECKNO-ALLOYS SOLUTION

CHOCKY BAR



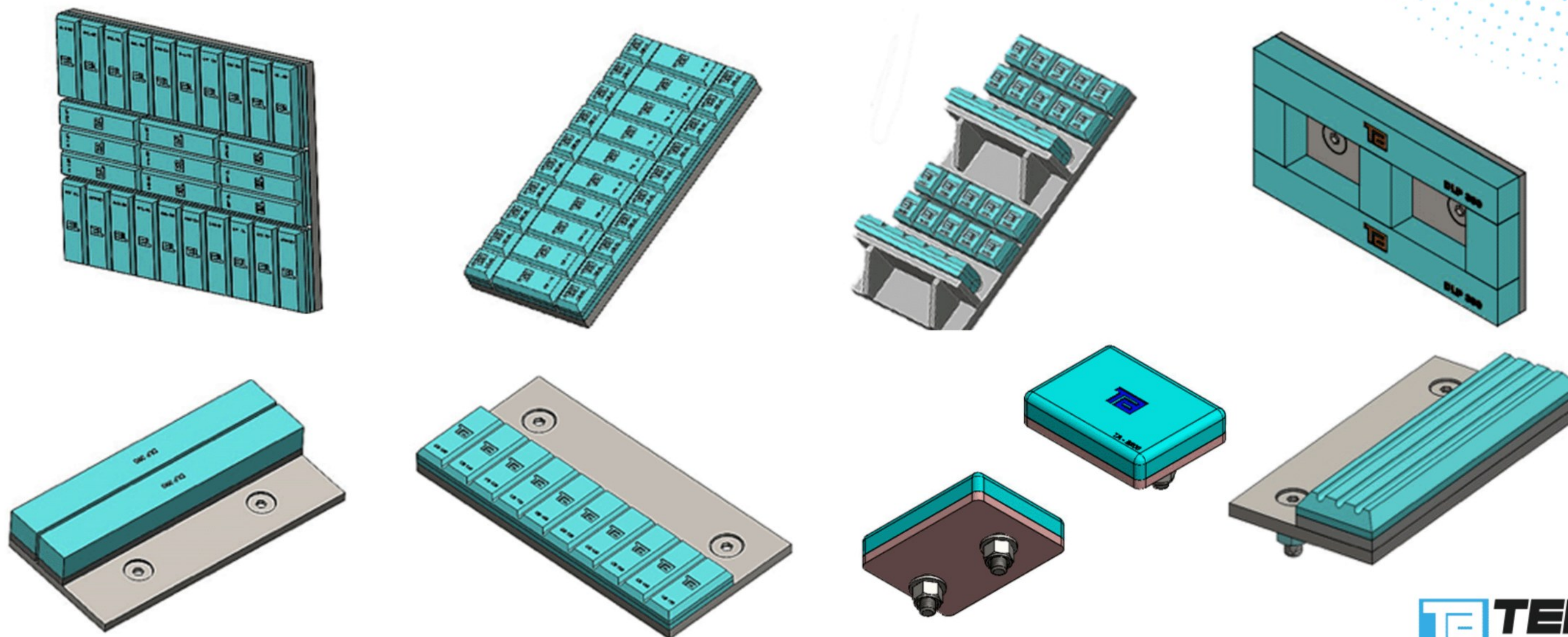
MAIN DIMENSIONS

- Carbon steel substrate, ASTM A36 type, 8.0 mm thick; weldable to most metals used in the Brazilian market
- Complex carbide overlay of Cr, V, Ti and W; uniform hardness of 700 HB; overlay thickness 15 mm
- Bonded by diffusion/capillarity system, with bond strength of 65 kg/mm²
- Supplied in 240 mm long pieces, with 40 mm sections to facilitate splitting and application in smaller spaces
- Main dimensions: overlay thickness = 15 mm, total width = 40 mm, total length = 240 mm; 40 mm x 40 mm segments, sectioned by a groove angled at 75°
- Welding via the substrate with AWS-E 7018 – Ø 2.4 or 3.2 mm

x 390)

With low operating cost, CHOCKY BAR offers excellent weldability and was developed for use across diverse industrial segments. The bars are produced from a special high alloy with high abrasion and impact resistance, with a hardness of 700 HB (63 HRC).

EXAMPLES OF CUSTOM PROJECTS WITH STANDARD PLATES (190 x 390 AND 390 x 390)



» TECKNO-ALLOYS SOLUTION CHOCKY BAR PLATES

ROCK BOX PROJECT: WE APPLIED PLATES WITH DLP
AT THE BENCH ENDS.



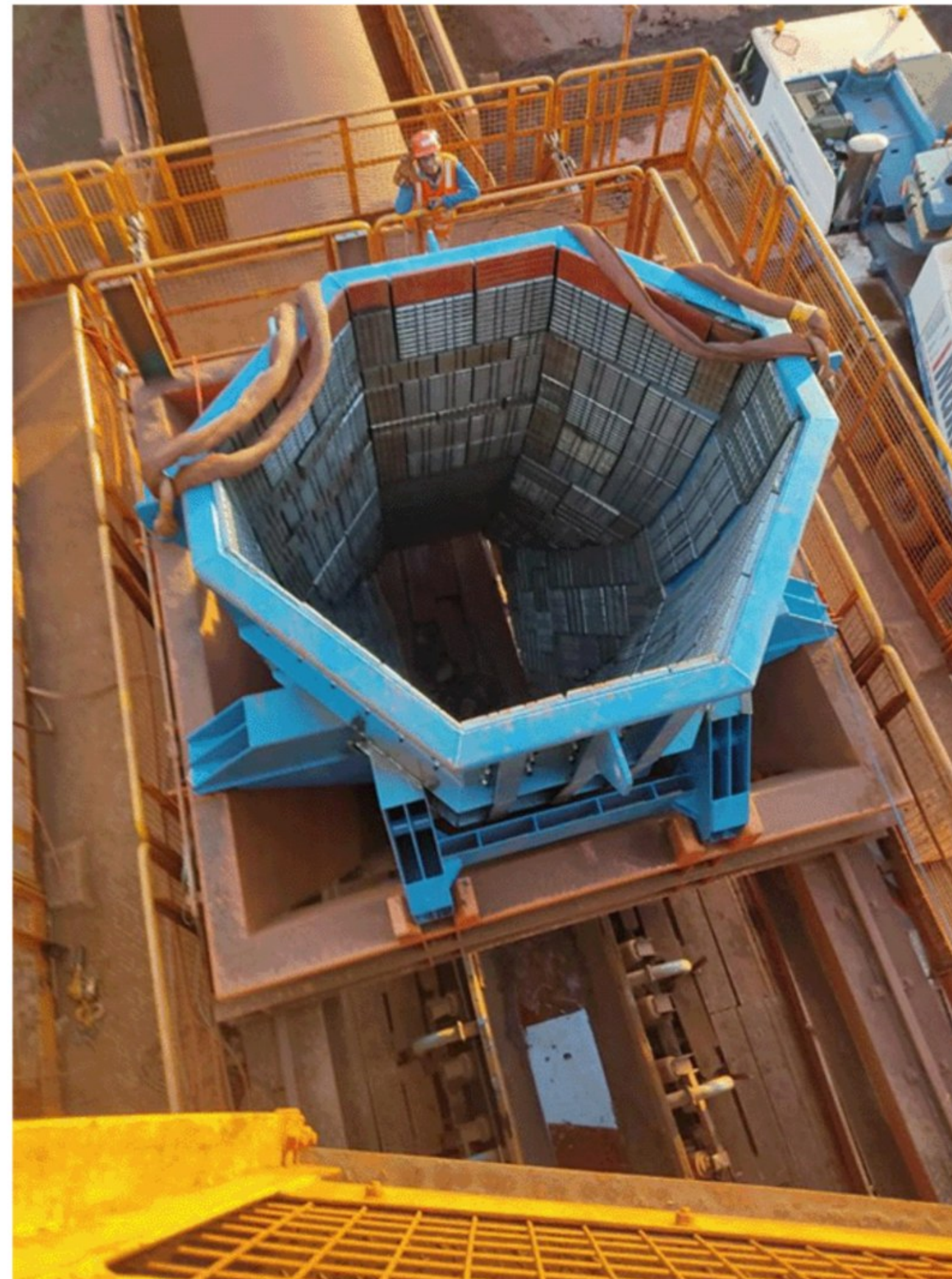
We carried out an inspection in Feb/2022, after 220 days in operation. During this period it handled approximately 3,000,000 (three million tonnes), with minimum wear of 3% on the 50 x 100 mm overlay shown on the TA plate.



Application date: July 2021.
Application site: Carajás Secondary Crushing.
Equipment: BR 122-02 feed chute.
Throughput: 650 tonnes/hour.

» TECKNO-ALLOYS SOLUTION CHOCKY BAR PLATES

APPLICATIONS OF PLATES LINED WITH CHOCKY BAR.

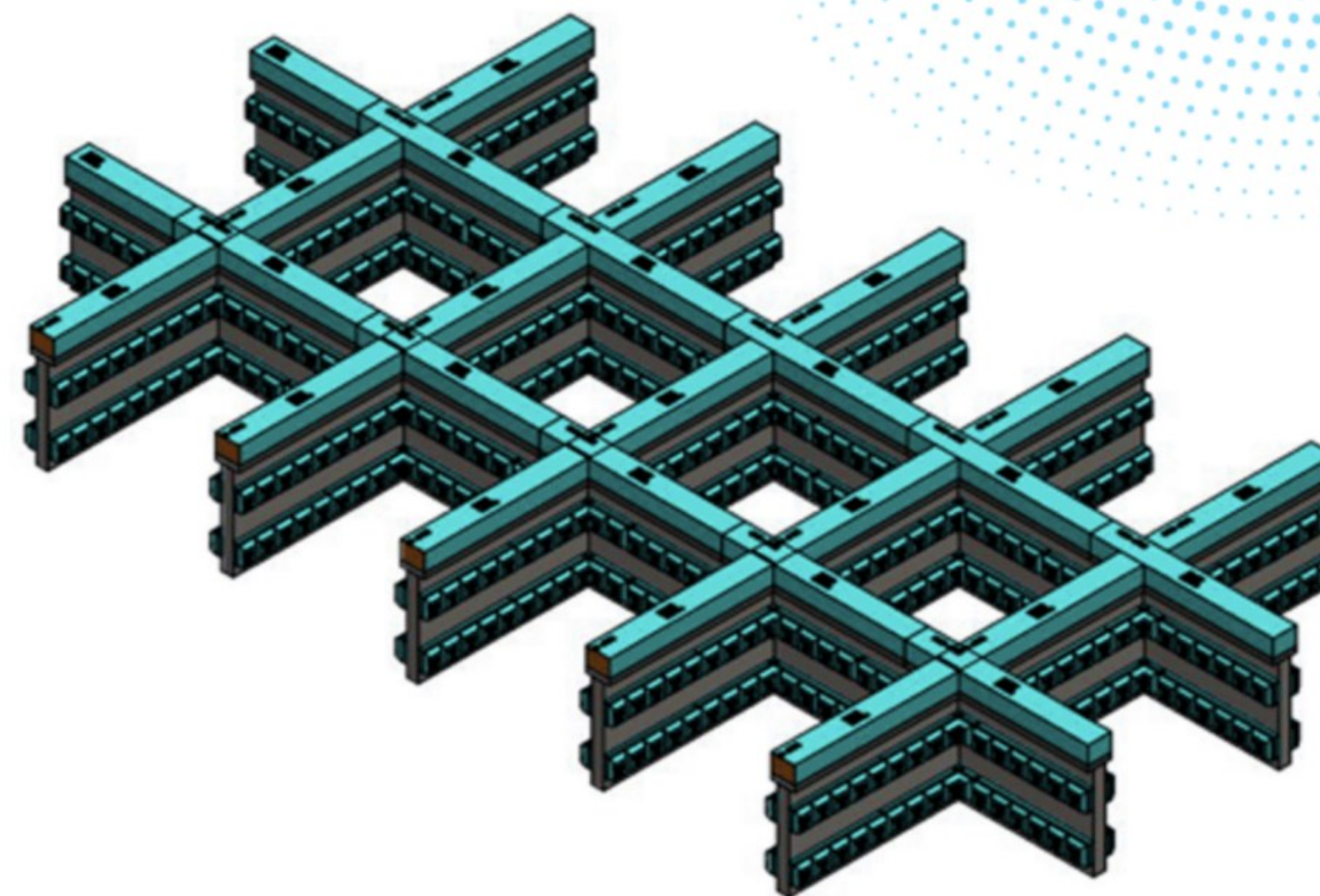


Standard plate application
lined with Chocky Bar —
we have a portfolio featuring
custom geometry.

» CONTINGENCY GRIZZLY



Grizzlies are generally made of carbon steel with a short service life.
The purpose of the grizzly is to contain blocks and parts of pieces.

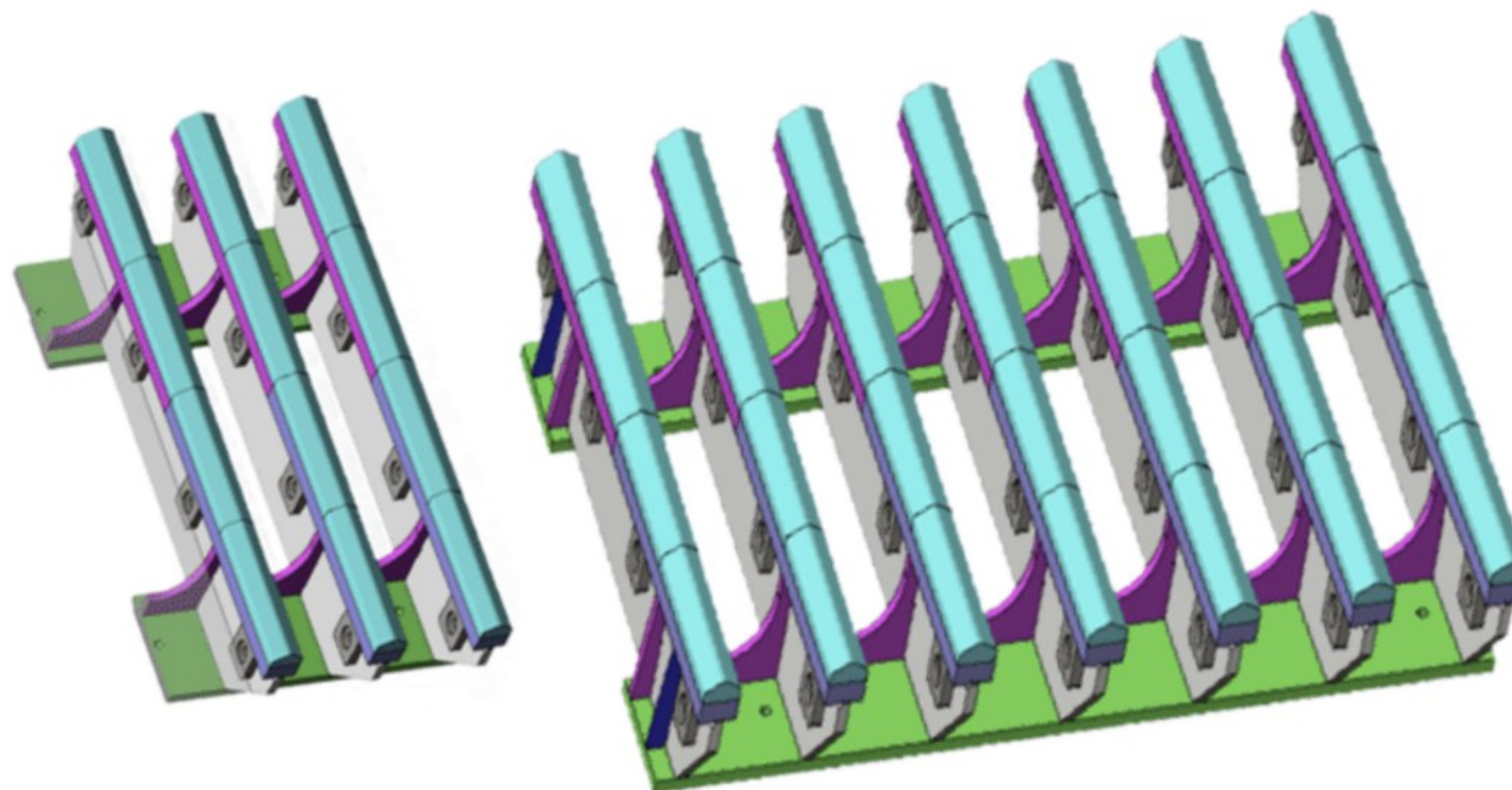


We developed a grizzly lined with Chocky Bar, applying a bar with 38 mm of overlay at a uniform hardness of 700 HB.

» VIBRATING SCREEN GRIZZLY



We developed a project with Chocky Bar alloy, with greater overlay thickness, providing higher equipment availability and safety for employees.



Grizzlies are currently lined with Chocky Bar; this concept has been delivering extended service life to equipment.

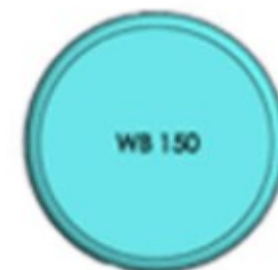
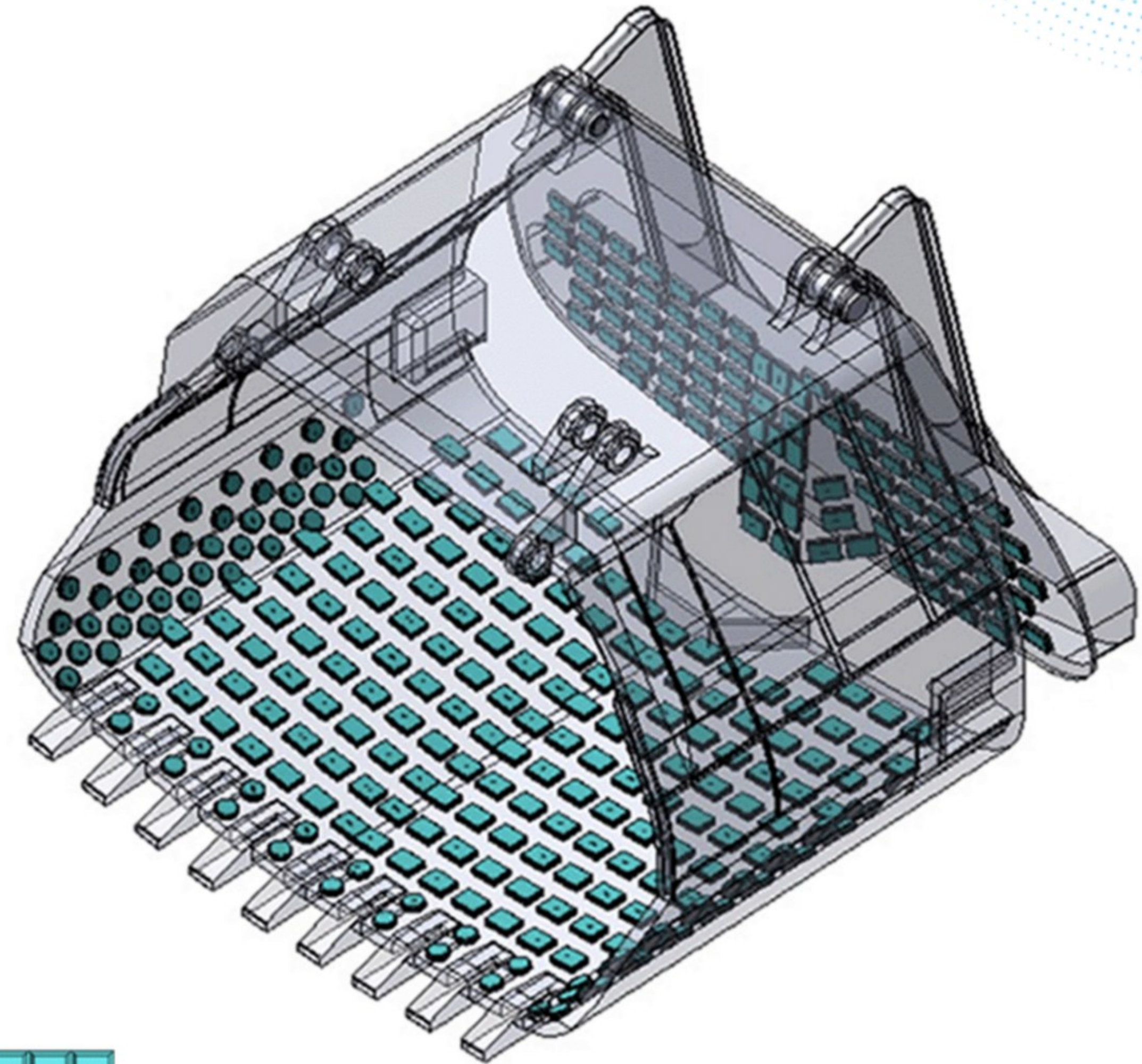
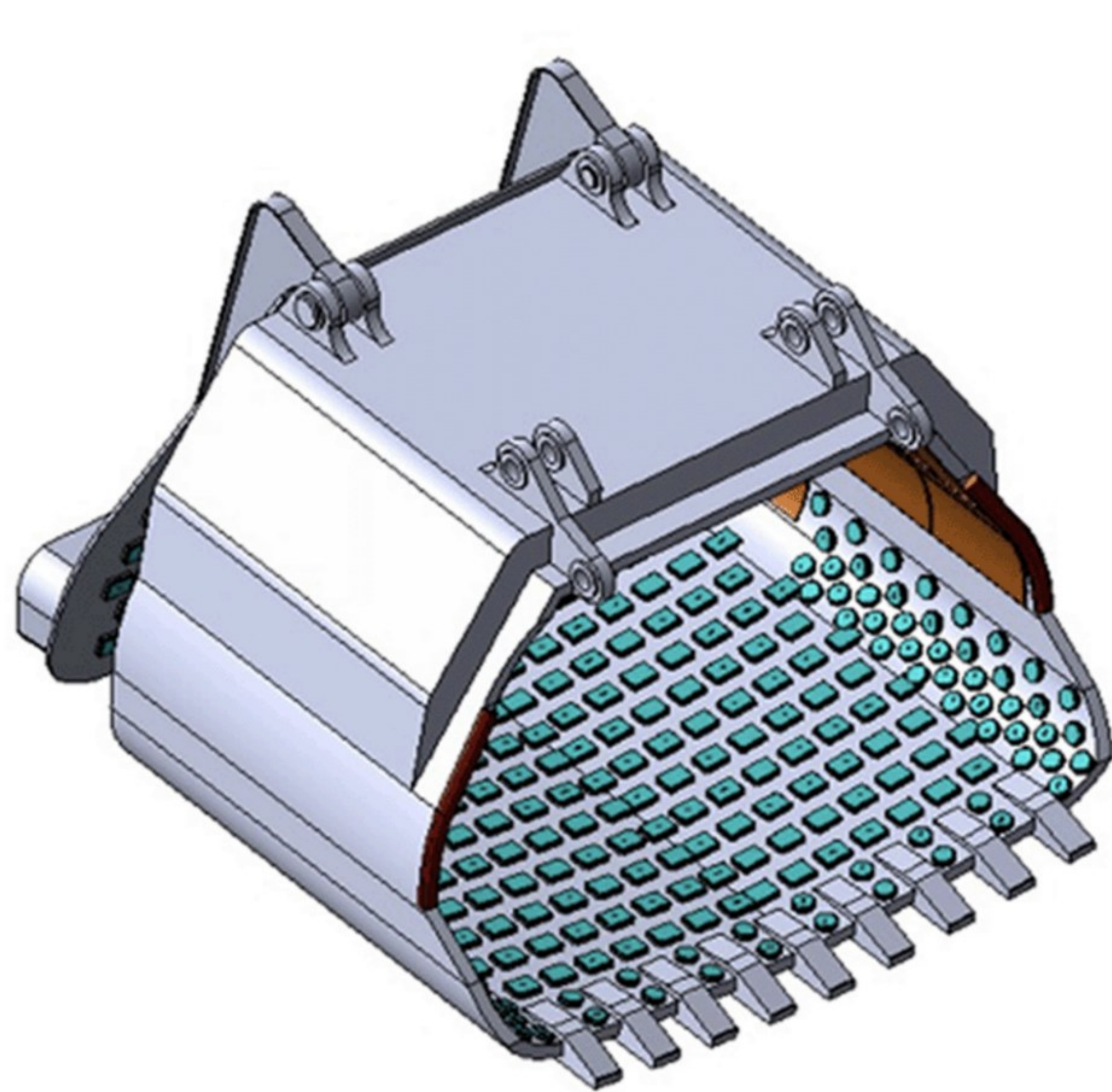
» TECKNO-ALLOYS SOLUTION

LARGE BUCKETS



TECKNO-ALLOYS SOLUTION LARGE BUCKETS

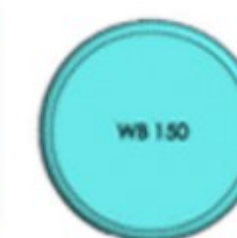
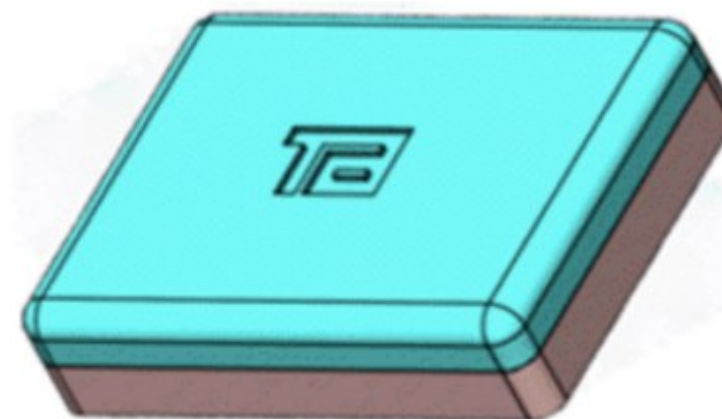
DESIGNED FOR SEVERE SERVICE, WITH HIGH IMPACT AND ABRASION RESISTANCE. DLP PLATES HAVE AN OVERLAY MASS BETWEEN 22 AND 80 MM WITH UNIFORM HARDNESS OF 700-740 HB.



» APPLICATIONS ON LARGE EQUIPMENT



We developed custom plates for high-impact applications with severe abrasion. For this type of application we use blocks 25 to 50 mm thick with a weldable A36 steel base.



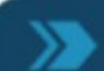
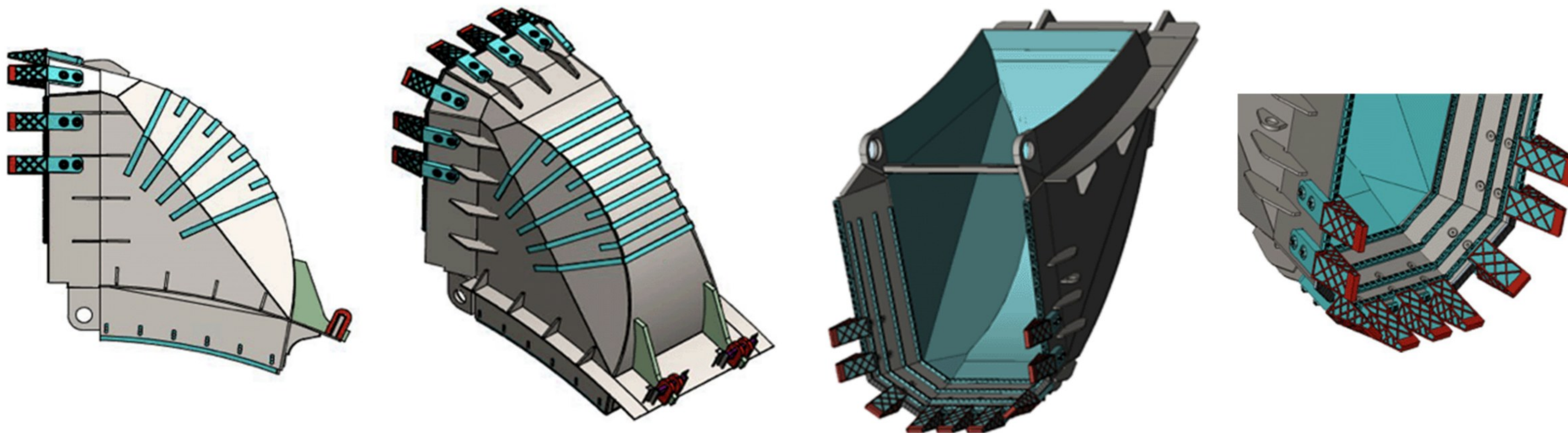
» **TECKNO-ALLOYS SOLUTION**
ENGINEERING
PROJECTS



TECKNO-ALLOYS ENGINEERING PROJECTS SOLUTION

TECKNO-ALLOYS DEVELOPS CUSTOMIZED PROJECTS; WE HAVE A TECHNICAL TEAM AND PROJECT ENGINEERING.

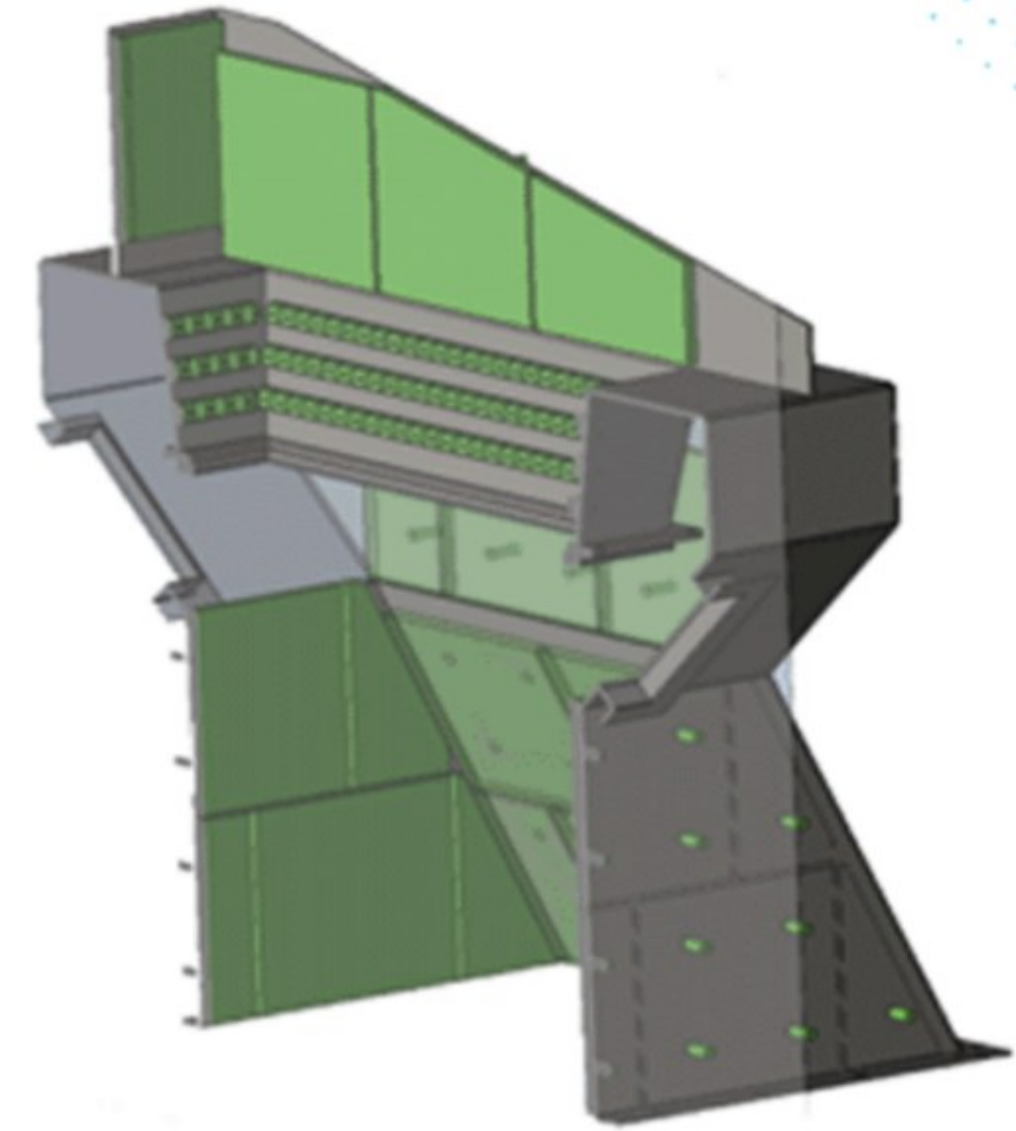
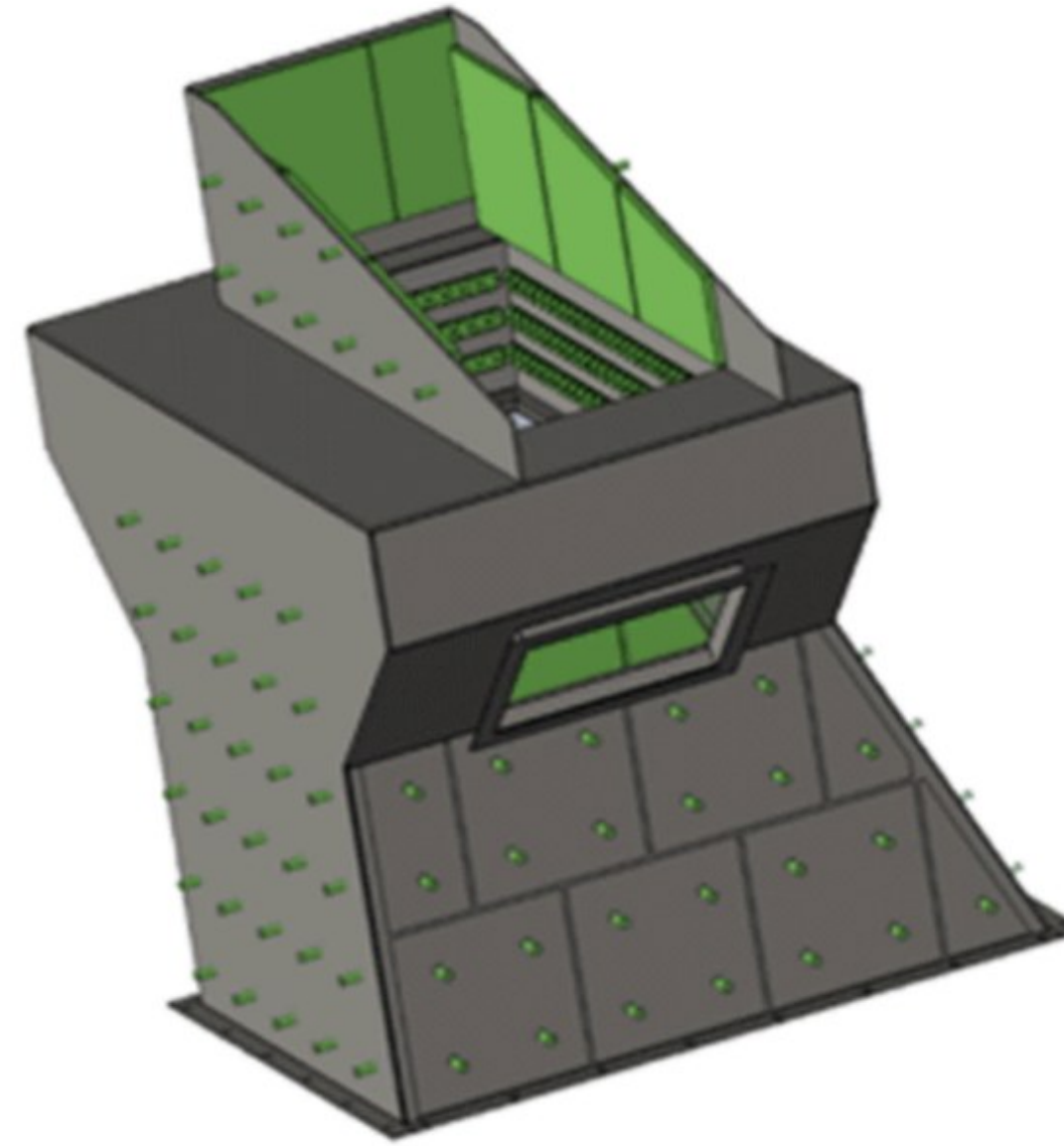
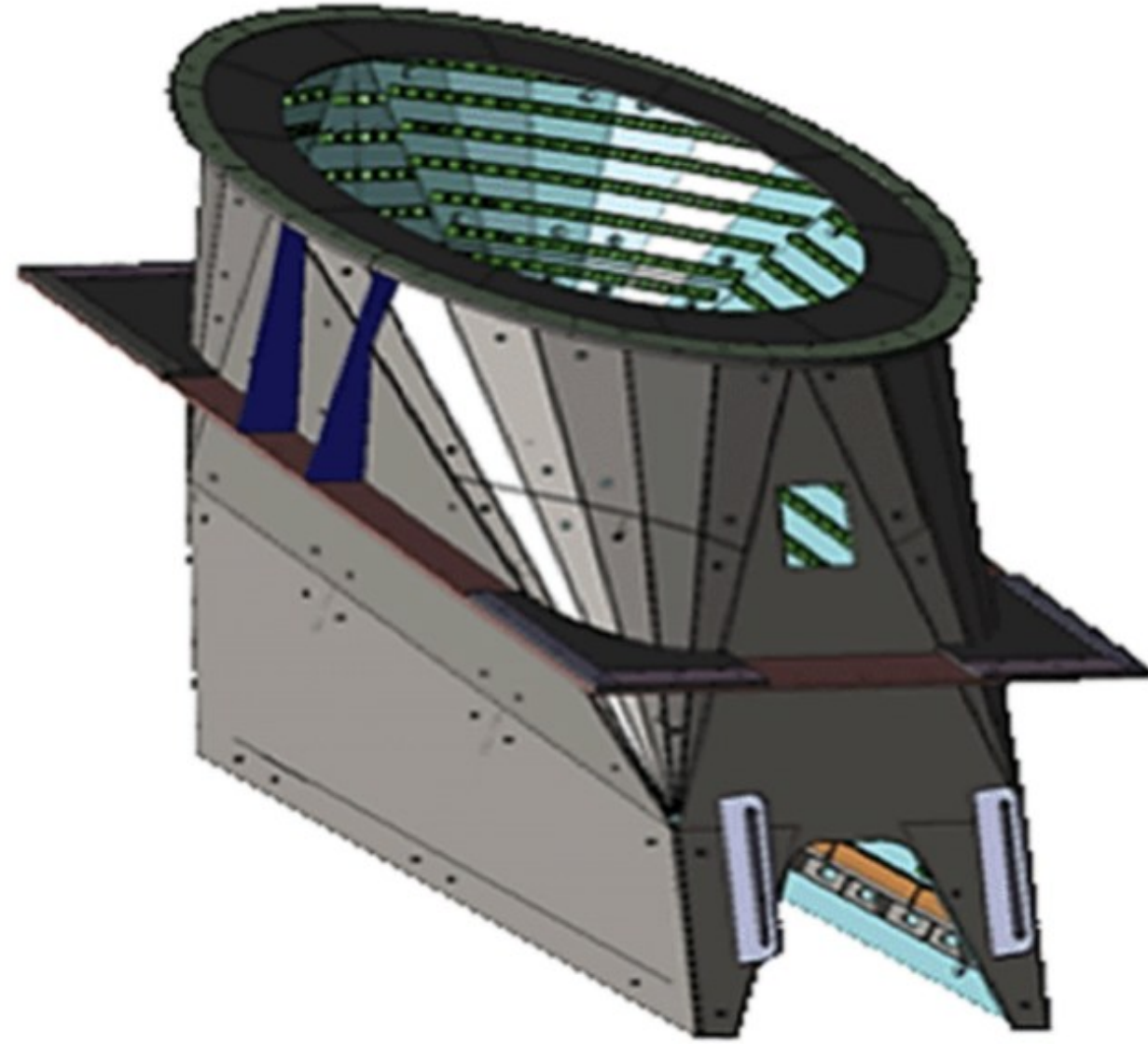
Customized projects: bucket for ore reclaimer.



PROJECT DETAIL:

- ✓ Edge overlay, CHOKY BAR and TUNGSTEN;
- ✓ Internal/external overlay, TECKNO – Ultra X (Cr 24, C 4.5, Nb 5.5, Mo 5.5, V 1.0, W 3.0);
- ✓ Teeth, high-chromium cast iron, overlaid with TECKNO-Ultra X.

» TECKNO-ALLOYS ENGINEERING PROJECTS SOLUTION



TECKNO-ALLOYS DEVELOPS CUSTOMIZED PROJECTS; WE HAVE A TECHNICAL TEAM AND PROJECT ENGINEERING.

Custom projects — in these projects we applied three different alloys.

» WE USE:

- ✓ CHOCKY BAR
- ✓ TUNGSTEN (SOLID INSERT)
- ✓ OVERLAY (COMPLEX CARBIDE)

» TECKNO-ALLOYS SOLUTION

TUNGSTEN

» TECKNO-ALLOYS TUNGSTEN SOLUTION

TUNGSTEN CARBIDE IS A MINERAL POWDER METAL, MAINLY COMPOSED OF COBALT AND TUNGSTEN. VARIOUS OTHER COMPONENTS ARE USED FOR SPECIAL APPLICATIONS.

Industrial Challenges:

- Excellent weld density = 0.003" to 0.005" (0.076 mm to 0.127 mm)
- Silver brazing with no voids < 0.010" (0.254 mm).

Pronounced thermal expansion with tungsten carbide vs. (Arrimo).

Mechanical Properties:

- Protection plate = 63,000 psi
- Excellent tensile strength
- Coverage = 11,000 psi

Bond Strength:

- The base strength of the material approaches 100,000 psi (690 MPa tensile strength).
- Torsional strength up to 25,000 psi (172 MPa)
- Heat resistance = application up to 800°F (425°)



We manufacture custom plates, we have silver-alloy brazing technology, we can braze onto 1020 steel / stainless steel, with a minimum base thickness of 3 mm

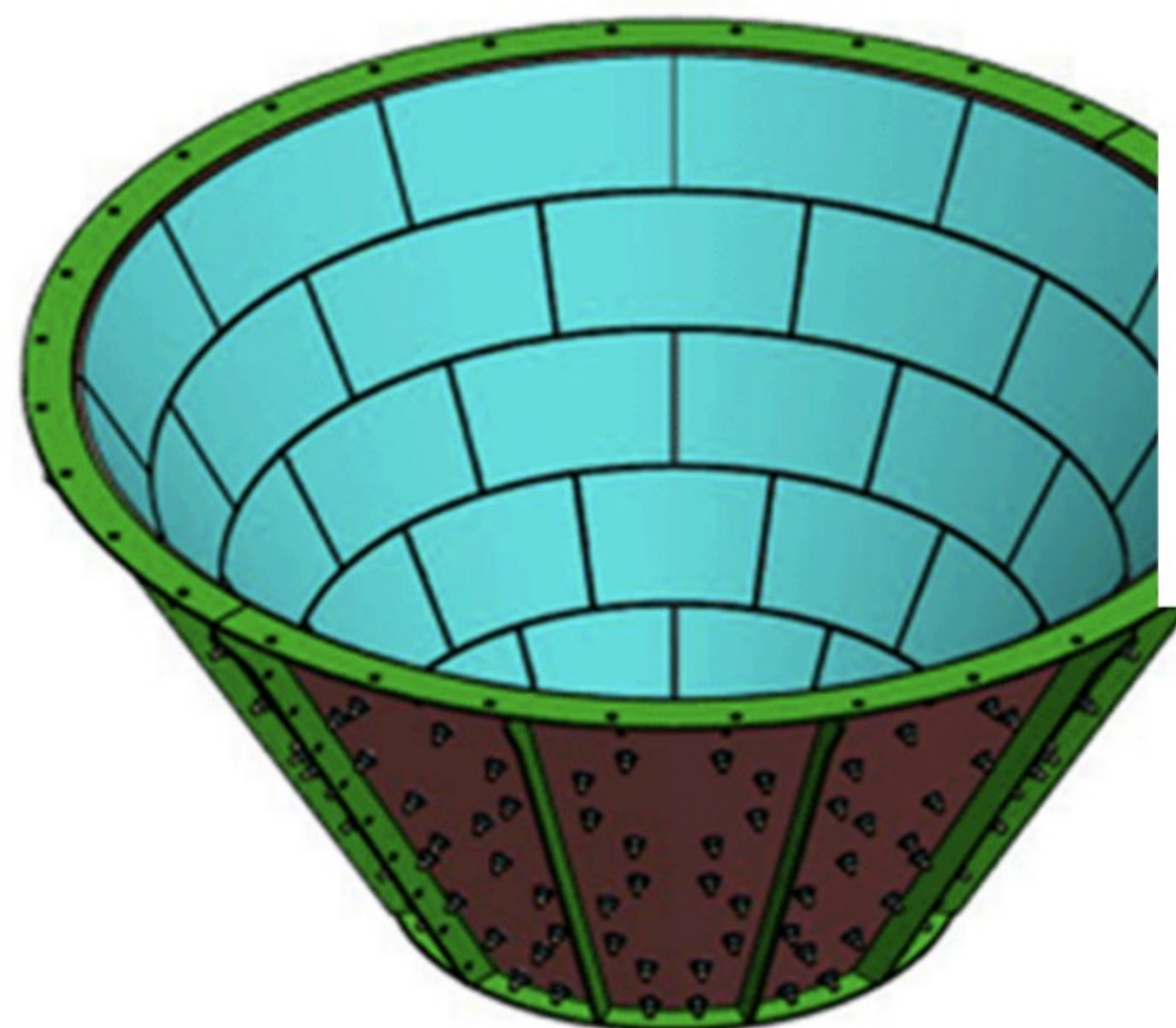
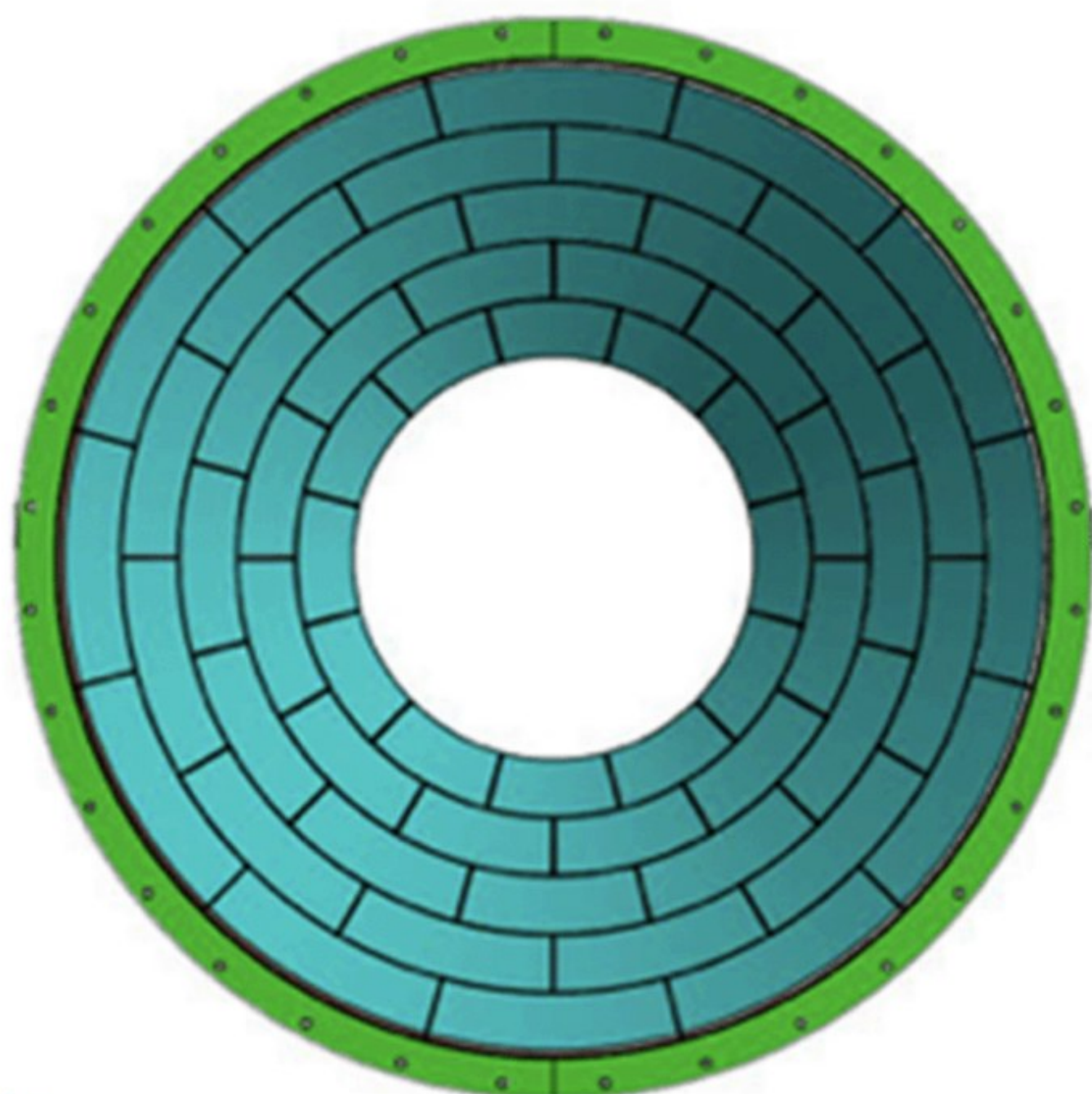
CHEMICAL AND PHYSICAL COMPOSITION OF TUNGSTEN CARBIDE:

TUNGSTEN	CARBON	MANGANESE	CHROMIUM	SULFUR	MOLYBDENUM	BARIUM	SILICON	PHOSPHORUS	HARDNESS
63.76%	4.0%	2.5%	28.0%	0.015%	1.25%	0.005%	0.45%	0.013%	93 HRA



TECKNO-ALLOYS SOLUTION TUNGSTEN

ENGINEERING PROJECT:



We can braze inserts on curved parts, pipes, chutes, exhaust systems and bushings; per the project, our overlay offers high abrasion resistance combined with moderate impact.

» TECKNO-ALLOYS TUNGSTEN SOLUTION

THERE ARE MANY GRADES AND TYPES OF TUNGSTEN CARBIDE
WITH SPECIFIC PROPERTIES AND APPLICATIONS:

GRADE / TYPE	TRANSVERSE RUPTURE STRENGTH / PSI	BINDER	ROCKWELL A
WEAR GRADE	250,000 psi (1724 MPa)	7%	90
IMPACT GRADE	420,000 psi (287 MPa)	15%	86
IMPACT GRADE	200,000 psi (1379 MPa)	6%	90.5
CORROSION RESISTANT	200,000 psi (1379 MPa)	17%	93
CARBIDE WITH BINDER	175,000 psi (1207 MPa)	0%	96

» **TECKNO-ALLOYS SOLUTION**
CERAMICS
TECHNICAL PARTS
AND PIPING



TECKNO-ALLOYS SOLUTION CERAMIC - PLATES

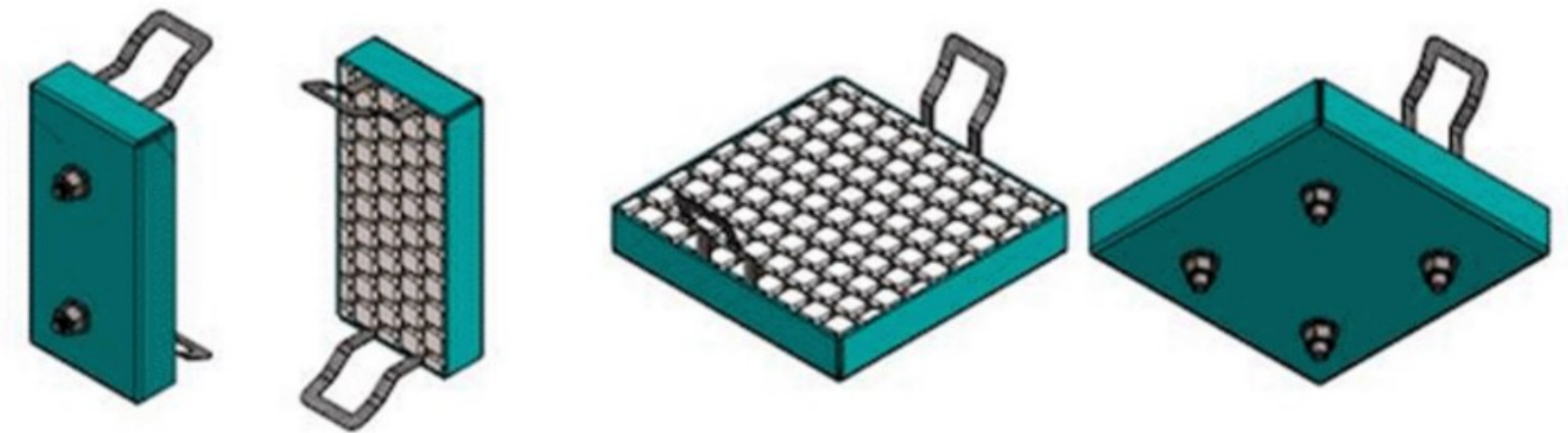
WE WORK WITH HIGH-ALUMINA CERAMIC LINING.



Plates lined with high-alumina ceramic Al_2O_3 -92% / 98%, vulcanized with 65 Shore natural rubber on an ASTM A36 / stainless steel base with anti-corrosion paint.

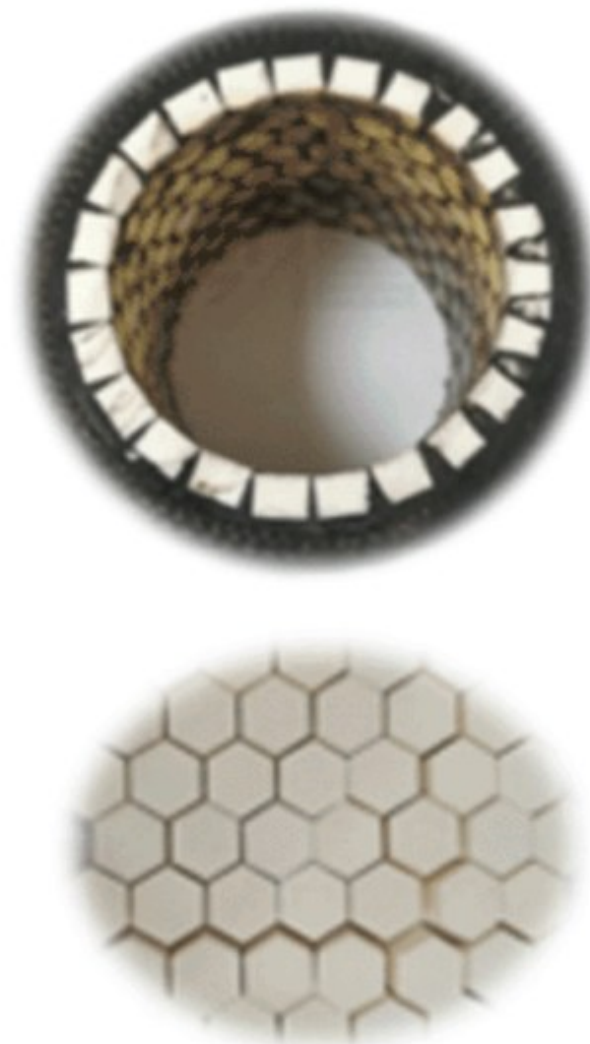
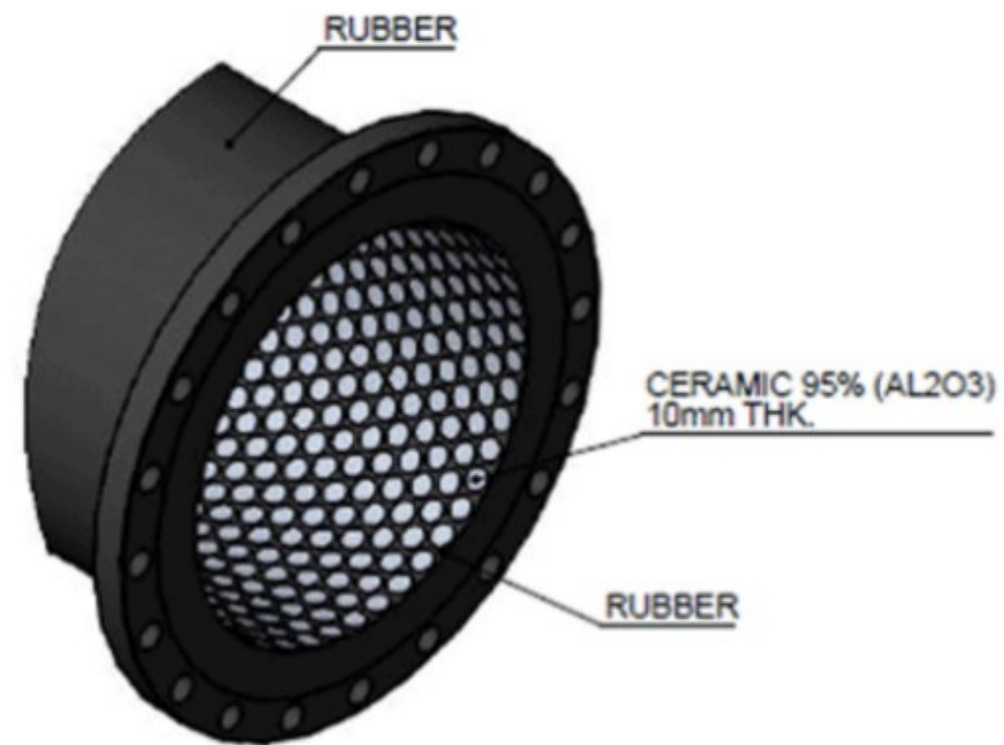
The ceramic lining offers high abrasion resistance and moderate impact; we apply it in piping, feed chutes and transfer chutes.

We offer high-alumina ceramic with a formulation that withstands high abrasion; in laboratory analysis our lining showed wear of $0.3\sim0.5 \text{ mm}^3$ and hardness of 1628 HV.





TECKNO-ALLOYS SOLUTION CERAMIC - PIPES PIPES LINED WITH HIGH-ALUMINA CERAMIC.



We manufacture pipes and bends in rubber or 1020 steel / stainless steel, in any diameter.

Our design has 1/2 mm spacing between tiles, with 95%~98% Al₂O₃.



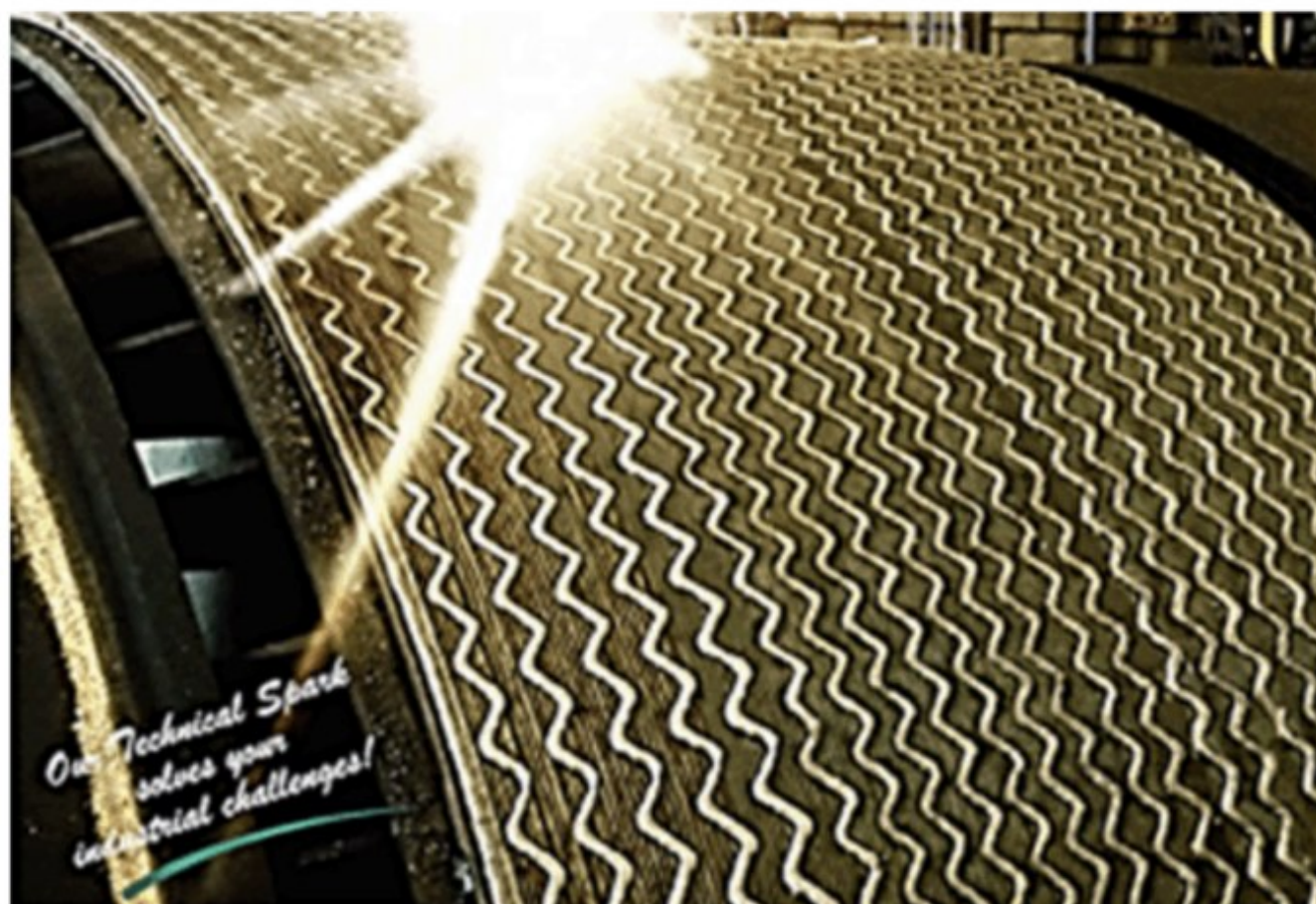
» **TECKNO-ALLOYS SOLUTION**

OVERLAY

TECKNO-X



TECKNO-ALLOYS SOLUTION OVERLAY - TECKNO-X OVERLAY PLATES LINED WITH CHROMIUM CARBIDE



TECKNO-X plates are produced under rigorous quality control and inspection, ensuring a product suited to diverse uses in severe service conditions and across various industrial segments.

TECKNO-X offers a range of overlay and base metal thicknesses, from 3 mm of overlay to 27 mm of overlay; the base metal can be chosen by the client, from carbon steels to stainless steels, in any commercial thickness.

Complex carbide plates — C, Mn, V, Cr, Nb, B — are a traditional formulation found worldwide; our TECKNO-X plates have important differentiators over the others, with minimum hardness of 58–66 HRC.

Teckno-Alloys develops special alloys with the addition of tungsten; the TECKNO-X1 overlay offers high abrasion and impact resistance (Cr 24 – C 4.5 – Nb 5.5 – Mo 5.5 – V 1.0 – W 3.0).



» TECKNO-ALLOYS OVERLAY SOLUTION - PIPES

PIPES LINED WITH COMPLEX CARBIDE.



- ✔ Complex chromium carbide wear pipe provides excellent resistance to abrasion, erosion and impact in many practical applications.
- ✔ It is designed to greatly extend service life where material flow causes wear in the conveying system.
- ✔ Easy to install; it can be custom-made to assist with pipe design or replacement.



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