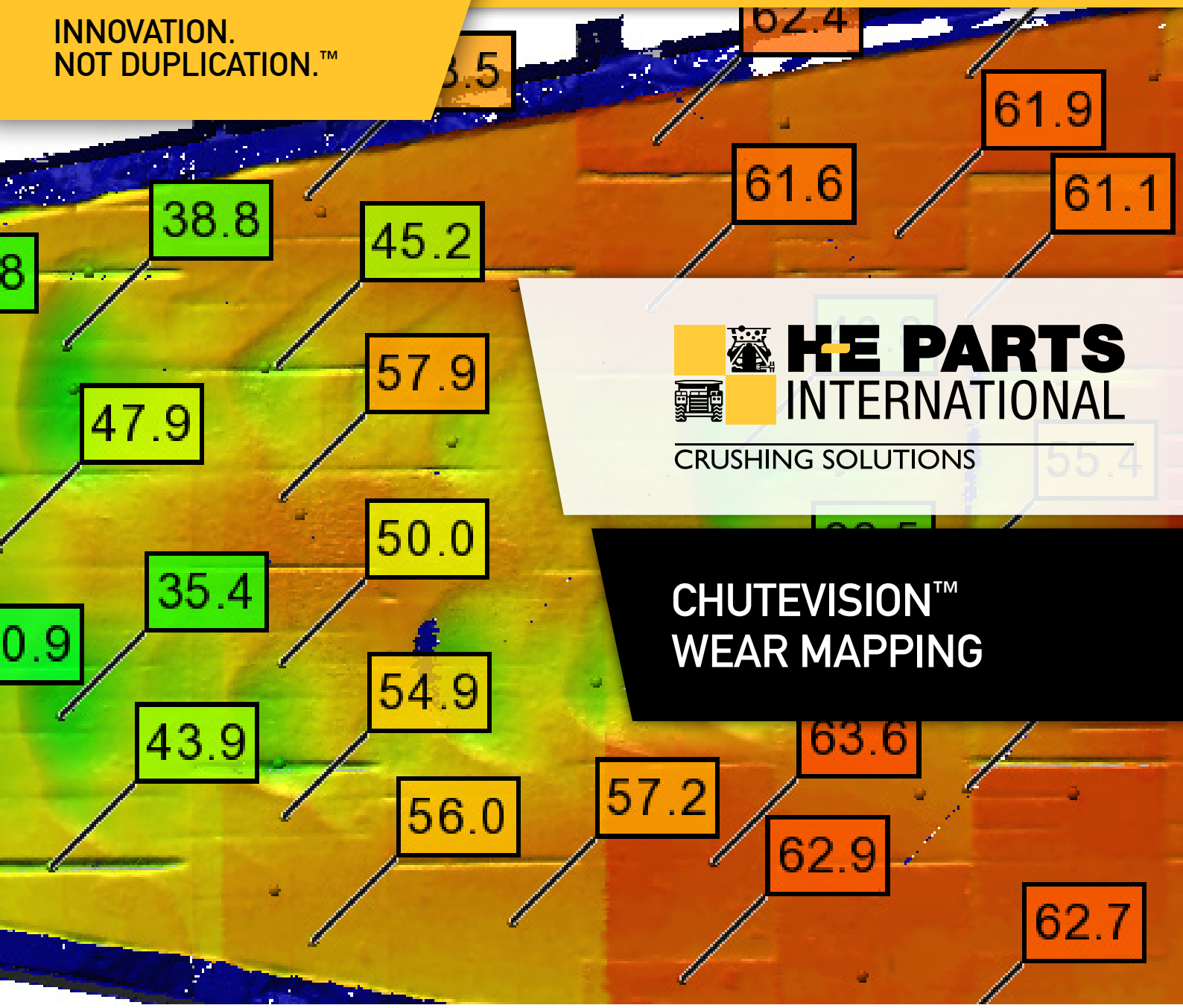
INNOVATION.
NOT DUPLICATION.™



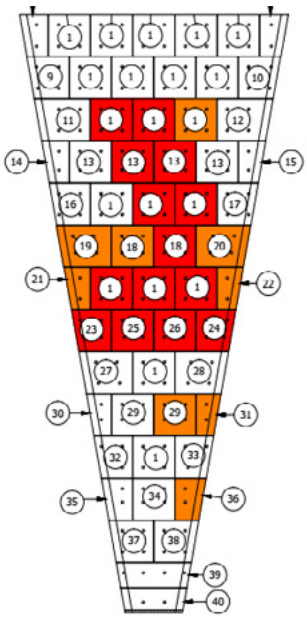
H-E PARTS INTERNATIONAL
CRUSHING SOLUTIONS

CHUTEVISION™ WEAR MAPPING

H-E PARTS INTERNATIONAL (H-E PARTS) SPECIALIZES IN PROVIDING WEAR MANAGEMENT SOLUTIONS. OFFERING A FULL RANGE OF PROTECH™ WEAR PROTECTION PRODUCTS, H-E PARTS PROVIDES THE RIGHT MATERIAL OR COMBINATION OF MATERIALS FOR EACH APPLICATION.

PROPRIETARY WEAR MANAGEMENT SOFTWARE

In line with our commitment to provide additional value to our customers, H-E Parts developed ChuteVision™, a combination of processing, reporting and analysis software that utilizes point cloud data captured from laser scanning devices. ChuteVision™ provides our valued customers with accurate forecasts of remaining liner life, graphical reporting and performance analysis based on operational data. Depending on the requirements set out by the customer, the reporting resolution can be adjusted for either complete chutes, zone monitoring or even individual liners of interest. ChuteVision™ allows the ability to plan liner change-outs more accurately, reducing wastage and minimizing costly stock levels.



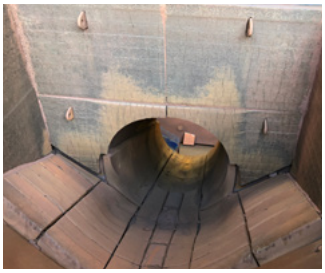
Typical applications where ChuteVision™ wear mapping provides customers with significant benefits include:

- Transfer, mill and train load out chutes
- Crusher and screening chutes
- Material deflectors and rock boxes

PROCESSING OPTIMIZATION

RAW DATA CAPTURE

H-E Parts performs raw data scans at any of our regional branches or on customer sites, regardless of how remote. With the use of best in class 3D laser scanners, H-E Parts can accurately capture all the required datapoints around the areas of interest (AOI), where scanning times are dependent on the size and point cloud density required to complete the works. For best results, AOI's needs to be free from ore and dirt build up with limited vibration. Because of this, scheduled shut downs are considered to be optimal and our experienced scanner operators will work closely with scheduling and maintenance teams to minimize any disruptions during critical tasks on site.



Worn chute

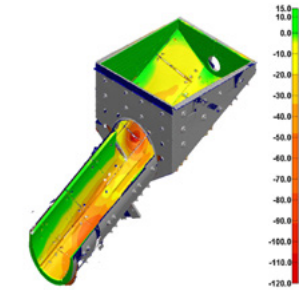
PROCESSING AND DEVELOPING REPLACEMENT LINERS

Once scanning has been completed, the raw data is processed, meshed and aligned, ready for further development. Dependent on the scope of works outlined at the start of the project, our qualified Engineering team will commence with:

- Back modelling to produce as-built drawings of existing chutes if no drawings are available
- Matching new wear liners to suit the current fixing method with the chute parent metal for ease of installation.

DEVIATION PLOT

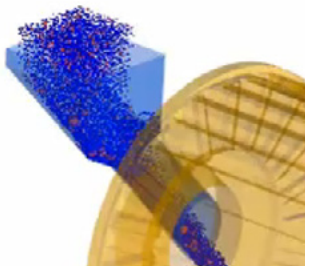
CAD models (either derived from previous scans or supplied by customers) are used to compare the variance between the generated scans and existing models. The information supplied during this comparison is represented through the process of weather mapping, also known as a deviation plot, where each reference point is color coded to visually distinguish high areas of wear.



Deviation plot

REPORTING & ANALYSIS

Findings from scans and model overlays can then be utilized to report on existing wear patterns, remaining wear liner life and outline areas of improvement. Further analysis can also be done by cross referencing customer supplied operational parameters (tonnage, particle sizes etc.) to assist in providing a holistic view of the current performance and efficiency of the chute. Wear liner selection, validation simulations, chute modifications and/or other recommendations on process improvements can then be made utilizing H-E Parts full range of ProTech™ wear products and internal manufacturing capabilities.



DEM modeling

SITE SPECIFIC OPTIMIZATION

More complex solutions can also be considered after analysis. An example of this would be converting a fixed chute to have one (or multiple) rotable sections within high wear areas to significantly reduce downtime during relines, or utilizing advanced Discrete Element Method (DEM) simulation software to fully optimize ore trajectory and flow for maximizing chute performance.

Upgraded chute

CUSTOMER BENEFITS

ChuteVision™ wear mapping facilitates wear profile analysis for any type of bulk material transfer chute, and allows the accurate prediction of remaining liner life. This provides customers the opportunity to assess areas of severe wear, allow consideration of design improvements to avoid unplanned maintenance and develop confidence in their planned maintenance schedules. Additionally, H-E Parts have the ability to provide modifications to chute geometry to ensure our customers anticipated production targets are reached and optimal wear liner performance achieved, through the use of advanced software such as DEM simulations. These simulations assist in the optimization of chutes and ore transfer applications and provide the opportunity to validate proposed design improvements prior to installation.