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3D Profiling is an automated process of cutting 3-dimensional forms on metal pipes, beams and other profiles.

These cuts prepare the profiles for the purpose of forming welded connections.

While 2D profiling is where flat bars or plates are cut, 3D Profiling is the cutting of 3-dimensional forms on non-flat material, thus forming a precise geometrical fit in order to create strong welded connections.
Freedom to create

Multipurpose Hall @ Lusail
Freedom to create

Medina airport
freedom to create

Beatrixlaan & De Twist
Freedom to create

Fifa Worldcup I 2018
Freedom to **create**

**Urban Allloy Towers** | **Queens NY**
HGG in 3 steps

**Save 20% on Material Costs**
- Optimised nesting
  - Reduce scrap to the minimum
  - More parts and less raw material
  - Less handling required

**Freedom to Cut Any Shape**
- STEP Import
  - Import STEP files from a Solid Model
  - Decide start point, lead in/out
  - Choose different types of bevels

**Increase Machine Capabilities**
- New cutting shapes
  - Enter new markets with additional cutting shapes
  - Save costs with weld volume reduction macros
  - Intelligent cutting routines reduce cutting time

Software I developed in house
Automation of craftsmanship
Singapore is pioneering a new model of construction; PPVC

Concept
- In prefabricated, prefinished volumetric construction (PPVC), complete flats or modules made of multiple units complete with internal finishes, fixtures, and fittings are manufactured in factories; they are then transported to site to be erected in a modular manner.
- Typically relevant for hotels, hostels, budget condominiums, and other facilities with standard shapes and designs.

Impact
- Productivity improvement of up to 50% with respect to staffing and time savings.
- Minimal dust and noise pollution.
- Improved site safety.

PPVC: Room-sized modules are prefabricated & completed with internal finishes, fixtures and fittings, before being transported and installed on site.
Singapore’s current fabrication of PPVC is manual

Manual fabrication of PPVC module

- Slower & Longer Cycle time
- More skill labour dependency
- Poor quality finish
- Laborious
- Safety precautions must be taken

Automated Prefabrication of PPVC module

- Faster & Shorter Cycle time
- Less skill labour dependency
- Good quality finish
- Non-laborious
- Safer
To automate craftsmanship *to give the world of steel* the freedom to create.

“The average age of a certified welder in the US is 56”
“Manual thermal cutting imposes limitations on realising complex structural design. You just don’t want this.”
Material Order
Automated Profile Cutting
Hot-Dipped Galvanizing
Fit-Up and Tack Welding
Automated Robotic Welding
Delivery

**Auto**

**Area of Improvement**

<table>
<thead>
<tr>
<th>Productivity</th>
<th>Conventional</th>
<th>Automation</th>
<th>Savings</th>
<th>Improvement Expected (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manpower (no. of man-days)</td>
<td>24</td>
<td>15.5</td>
<td>8.5</td>
<td></td>
</tr>
<tr>
<td>Productivity (PPVC module/man-day)</td>
<td>$\frac{1}{24}=0.04$</td>
<td>$\frac{1}{15.5}=0.064$</td>
<td>4</td>
<td>$(0.064-0.042)/0.042=52%$</td>
</tr>
</tbody>
</table>
MPC450 @ Steeltech Singapore

**HGG MPC Multi-Profile Cutting Machine**

**Orion Application Solution Benefits:**
- Quality & Productivity Have Improved - Weld Draw Is Minimized
- Production Flow Has Improved by a Minimum of 20%
- Orion No Longer Outsources 45% of Its Fabrication
- One Person Now Does the Work of Eight
- Plant Safety Has Improved

**Sample cuts of Tubes, SHS, RHS.**

**Flat bar profiling station.**

**Inkjet Marking on profiles.**

**Tubular profiling from 48mm to 600mm O.D.**

**Squares & rectangular hollow section profiling**

**Tiong Seng Group**

**STEELTECH INDUSTRIES PTE LTD**
“The biggest advantages of HGG is their bevelled cuts on the profiles. That saves us many grinding hours.”

Hans Peter Labee, Hollandia Offshore
Design & Detailing

No more double input
Modelling with CAD software to create cutting data.

Design & Detailing

Optimise your weld preparation to save costs
Extensive detailing features (including detailing of STEP files).

Design & Detailing

Use your expensive raw materials in the most efficient way
HGG’s optimised nesting module reduces scrap to a minimum.

3D Profiling

Freedom in profiling
A wide range of profiling shapes is available to cover every conceivable need.

3D Profiling

High precision cutting
Specialised cutting head combined with cutting path optimisation.

3D Profiling

Intuitive machine interface
HGG focuses on consistent, intuitive and easy-to-use interfaces with all its products.

Fitting & Welding

Rapid and accurate fitting of parts
With HGG’s extensive marking features.

Fitting & Welding

Facilitates optimal welding
Through smart weld preparation.

Fitting & Welding

Efficient planning for fitters and welders
With HGG’s estimation software.
Design & Detailing
- Optimised nesting
- Detailing

3D Profiling
- Measurement
- Cutting quality
- Plasma
- RHS/SHS

Fitting & Welding
- Grind reduction
- Marking

3D profiling in 3 steps

"HGG specialises in 3D profiling: when we talk about 'reduction' we mean real difference."

30% more productive and accurate than any other profiling machine.
3D profiling in 3 steps

- Streamlined CAD import
- 100% Freedom to design

“HGG has been our development partner for many years, they supply the best there is within our industry.”

Saku Järvinen
Tekla - Business Development Manager

Free form .STEP* import

Direct import from Tekla

HGG’s free shape configurator

30+ HGG Software Engineers at your disposal for any other CAD interface.
Factory automation

- Seamless CAD integration
- Perfect cut quality
- Applying 3D weld parameters into the cutting geometry

Only with this a fabricator can implement a robotic arc welding system similar to that of Steeltech Industries.
Return on investment with HGG

Before: Hand Cutting
1 cut 800mm
marking: 164 sec
moving: 180 sec
cutting: 1880 sec
moving: 180 sec
grinding: 508 sec
total: 2912 sec
in minutes: 48.53 min

Time saved: 88.9%

Now: CNC Cutting
1 cut 800mm
marking: 0 sec
moving: 120 sec
cutting: 180 sec
moving: 0 sec
grinding: 20 sec
total: 320 sec
in minutes: 5.33 min

Approach Hand Cutting:
Step 1: Moving pipe on roller 5mins.
Step 2: Marking profile on pipe with template using chalk / dot punch 28 mins.
Step 3: Confirming all process before cutting 15 mins.
Step 4: Pipe cutting using oxyfuel gas 37 mins.
Step 5: Manual hand grinding surface 45 mins.
Total time: 130 mins + Loss time (20%) = 156 mins.

Total Cycle time for 293 pipe = 45708 min = 761.8 hrs

Approach Machine Cutting:
Step 1: Load the pipe: 5 mins.
Step 2: Load program or cut profile: 3 mins.
Step 3: Initialise start of cut: 2 mins.
Step 4: CNC Pipe Bevel profiling using oxyfuel gas cutting mins.
Step 5: Unloading of cut pipe: 5 mins.
Total time: 28 mins

Total Cycle time for 293 pipe = 8204 min = 136.7 hrs

Total time saving of 82.05%!