Airblast Tech Tips
Pipeblasting

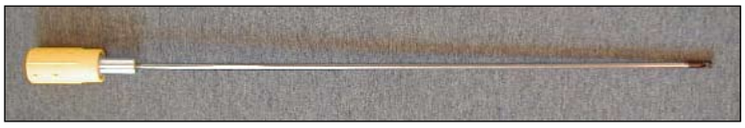
AIRBLAST

Introduction
Effective surface preparation is critical to ensure maximum coating performance. Each stage of the process can be accurately measured, from the climatic conditions prior to work commencing, through to the chloride content of the abrasive, as well as the blast profile, cleanliness, and wet and dry film thickness. However, certain applications, due to their nature, limit the possibilities of measuring the parameters associated with the successful surface preparation and coating application. One such application is the internal blasting of pipelines.

The two critical measurable parameters involved in surface preparation are surface cleanliness and surface profile. Numerous standards can be applied to surface cleanliness – however for this article will use the Swedish Association (SA) standards. By applying the SA standards, a contractor can identify to which degree of cleanliness he must prepare the surface. The standard most frequently specified by paint manufacturers is SA 2.5 – Near White Metal Blast Cleaning. This is defined as: "Removal of nearly all mill scale, rust, rust scale, paint, or foreign matter by the use of abrasive propelled through nozzles or by centrifugal wheels, to the degree hereafter specified". A near white blast cleaned surface finish is defined as one from which all oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter have been completely removed from the surface except for very light shadows, very light streaks or slight discolorations caused by rust stain, mill scale oxides, or light, tight residuals of paint or coatings that remain. At least 95% of each square inch of surface are shall be free from all visible residues, and the remainder shall be limited to the light discoloration mentioned above.

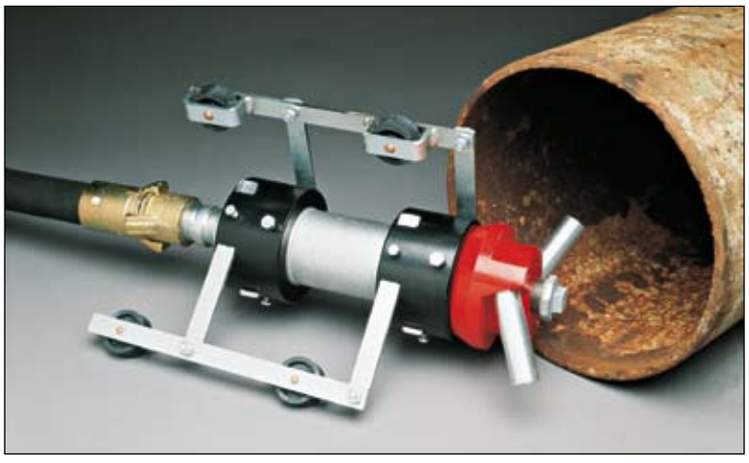
Surface Preparation
The various grades of surface cleanliness range from SA1: Brush off, through to SA3: white metal. It is also clear that the condition of the steel before blasting changes the appearance of each of the grades of cleanliness. Surface comparators can be used as a visual test to inspect the surface after blasting to establish the standard achieved.

Whilst preparing the surface to the correct standard of cleanliness, the contractor must also take into account the profile required to allow the coating system to properly adhere to the surface. Depending upon the specific coating system to be applied, the paint manufacturer will specify the profile depth required in microns. The contractor must ensure that the abrasive used has the necessary physical properties which during blasting, at a variable pressure, will result in the required profile depth. Various analogue and digital systems are available to verify the profile depth.
Pipelines of a smaller diameter present a specific problem in terms of access for abrasive blasting, as well as visual verification of surface cleanliness and profile achieved. Equipment to internally blast pipes is available, see next page.



Airblast Mini Blast
0.5” – 1.25” (13-32 mm)

Airblast Circle Blast
1.25” – 12” (32 - 305 mm)



Airblast Spinner Blast
8” – 36” (204 - 915 mm)

Airblast Jumbo Pipe Blaster
35” - 63” (890 - 1600 mm)

Traditionally, these types of blasting systems required the equipment to be manually pulled through the pipe. Any increase or decrease in speed would result in a variance in blasting cleanliness and profile and, due to the access issues described above, when blasting smaller diameter pipes of a significant length, access to verify the cleanliness and profile is impossible. Therefore, the only way to ensure that the surface is prepared to the required standard is the mechanization of the blasting process. This removes the possibility for any variation of the speed at which the equipment is pulled through the pipe. In the past, the mechanized equipment was not only expensive and complex, but also not portable.

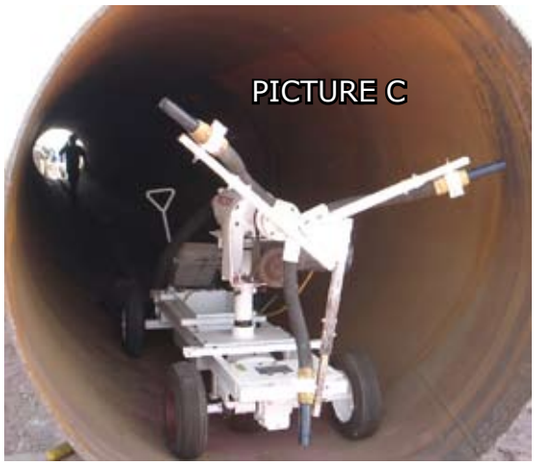
Airblast Winch System

With the introduction of the Airblast winch system (SEE PICTURE A) the contractor can blast one pipe in sections at controllable, recordable speeds, before cutting the sacrificial pipe in half to verify which speed achieves the desired result. Once established and recorded, the blasting can continue with the assurance that the equipment is pulled through the pipe at a constant speed. Recordings taken from the ends of the pipe are used as an extra check that the performance does not deteriorate. The Airblast winch system has been used to great effect in numerous contracts, and in all cases the portability and the repeatability of the system has improved the quality of the surface preparation.

PICTURE A

For pipes with a large enough diameter (1.5 meters and greater) to physically enter the pipe to verify the surface cleanliness and profile is straightforward, but the blasting process is not. Manual blasting, whilst physically possible, is not only impractical but also dangerous, also the diameter of the pipes is too large to use with the conventional ranges detailed above. As can be seen in the picture (SEE PICTURE B & C), automated blasting of these sizes of pipes is possible, utilizing standard blasting spares with the Airblast pipe blasting system. Following blasting, the verification of the cleanliness and profile can be carried out manually.

PICTURE B

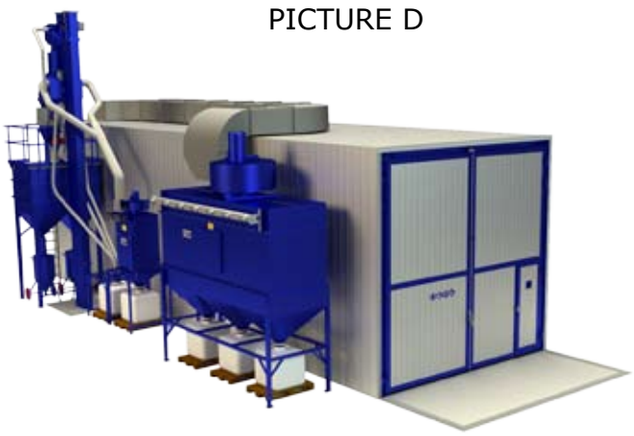


Whilst the surface preparation of the external surfaces of pipelines is not hampered by the same access issues posed by the internal areas, there are still issues which need to be addressed. The location of the surface preparation operation is critical, whether at a remote plant before being transported to site, or actually loaded onsite.

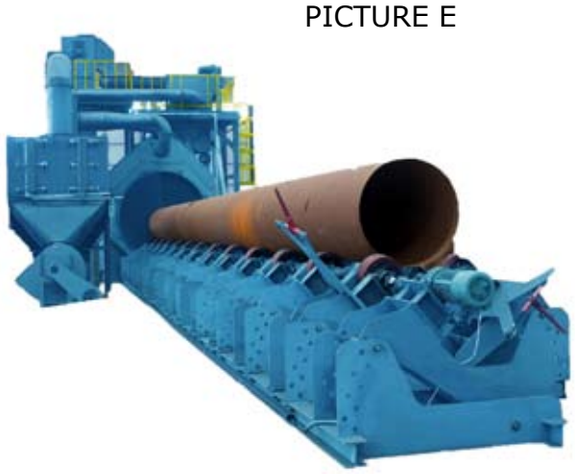
Blast Locations

Of course, the most obvious choice for blasting at a remote plant is a blast room (SEE PICTURE D). Economies of scale generated by the use of steel abrasive, as opposed to disposable abrasive, as well as the ability to standardize the material handling solution, allow for not only high production rates, but also an environmentally blasting process. It could be argued however, that a stationary wheel blast machine (SEE PICTURE E) dedicated to pipes enjoys more advantages than the limitations it imposes when compared to a blast room. After all, manual blasting production rates (even in a blast room utilizing steel abrasive) are still limited by the blaster holding the nozzle – stationary wheel blast machines will achieve the same production rate on Monday mornings as they do on Friday evenings!

PICTURE D



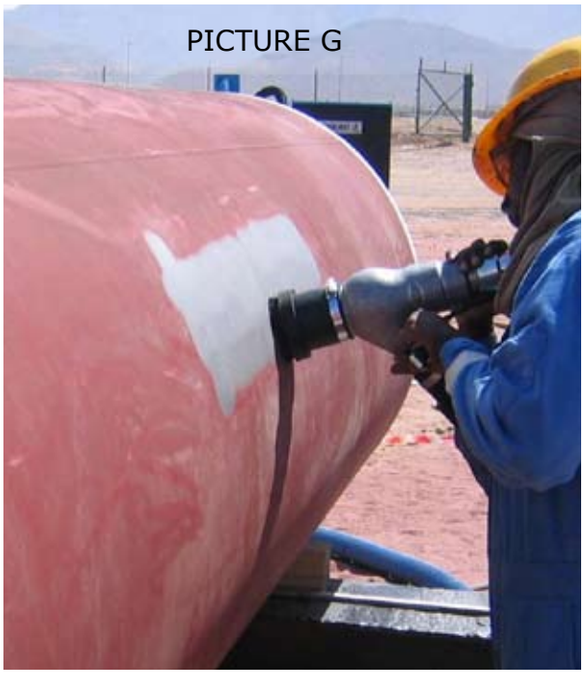
PICTURE E



Should the option to blast onsite be taken, or should remedial touch up blasting, or even weld seam preparation be required, vacuum blasting is also a viable option (SEE PICTURE F & G). The slow and cumbersome systems available in the past have been dramatically updated with the most powerful systems, now able to blast with steel abrasive and achieve almost the same production rates as manual open blasting. Reasonable portable and environmentally friendly, these systems allow tight control of the blasting parameters.

PICTURE F

PICTURE G



Conclusion
Fully utilized and maintained equipment is an invaluable asset to the blasting and painting contractor. Whilst manual input will always be required the quality, repeatability, and production capacity automation offers cannot be ignored. Airblast offers a full range of blasting and painting equipment for diverse applications including pipelines and will be happy to discuss your requirements.

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