



Figure 10 5 m long wall built on CNC gantry system

However, using robot as well, it is possible to build large structures using multiple robots or using robots on linear drives to facilitate the moving the robot as a whole to deposit at various places and increase its working envelope. Figure 11 shows multiple robots building an aluminum rib.



Figure 11 Multiple robots building a long Aluminum rib

4. Conclusion

From the factors listed above, it is clear that usage of either CNC gantry system or robotic system is purely dependent upon application. Robotic system is preferred when the part is to be built with lower cost, very long, involves rotating of the part, to be built in a global inert environment. On the other side, CNC gantry system is preferred when the part is to be built with high accuracy levels, involves additional processes like rolling, machining etc.

References

- [1] Almeida, P. (2012), Process control and development in wire and arc additive manufacturing, PhD Thesis, Cranfield University. U. K
- [2] Levy, G., Schindel, R., Kruth, J.P., (2003), Rapid Manufacturing and Rapid Tooling with Layer Manufacturing (LM) Technologies, State of The Art and Future Perspectives; CIRP Annals Vol. 52/2/2003; p. 589-609
- [3] Kruth, JP., Leu, MC., Nakagawa, T., (1998), Progress in additive manufacturing and rapid prototyping. CIRP Ann-Manuf Techn 47:525-540
- [4] Ding, D., Pan, Z., Cuiuri, D., Li, H., Wire-feed additive manufacturing of metal components: technologies, developments and future interests (2015) International Journal of Advanced Manufacturing Technology, 17 p. Article in Press.
- [5] Pandremenos, J., Doukas, C., Stavropoulos, P., Chryssolouris, G., (2011), Machining with robots: a critical review. In: Proceedings of DET2011.
- [6] Vergeest, J. S., & Tangelder, J. W. (1996), Robot machines rapid prototype. Industrial Robot, pp 17-20.
- [7] Martina, F., Mehnen, J., Williams, S. W., Colegrove, P. and Wang, F. (2012), Investigation of the benefits of plasma deposition for the additive layer manufacture of Ti-6Al-4V, Journal of Materials Processing Technology, vol. 212, no. 6, pp. 1377-1386.
- [8] Siminski, M. (2003), Weld path optimization for rapid prototyping and wear replacement by robotic gas metal arc welding, Phd Thesis, University of Wollongong, Australia.