CHAPTER – 9

Conclusion, Contribution and Scope for Further Research

9.1 Conclusion

In this research work a user friendly Welding Signature Analyzer (WSA) has been developed and its major functions are given below.

- Evaluation of Constant voltage welding machine performance using simple statistical tools.
- Monitoring online welding voltage and current signature.
- Recording online welding voltage and current with sampling rate variable from 10 samples/second to 100000 samples/second for duration of upto thirty minutes and processing the recorded samples for viewing the welding signatures. The signatures can also be selected either voltage or current at any desired duration or at any desired sampling range for detailed analysis.
- Computing statistical values, PDD and Z score curves for any desired range of recorded samples for quality evaluation.
- Calculating SCT, NBT, CT and spikes times of samples taken for signature analysis.
- Developing a Signatures Data Bank (SDB) for the given set of welding process parameters for using the welder (welding machine) for different weld joints.
- Used for determining the bench mark signatures and their statistical values for different process parameters made using the welding system. Further it can be used for online comparison for identifying the abnormal signatures also.
Frequently occurring welding defects like lack of fusion, burn through, lack of shielding gas/porosity have been identified using WSA.

9.2 Contributions

Major contribution of this research work is mention below.

1. A portable and user friendly Welding Signature Analyzer (WSA) for monitoring and recording large samples of weld data set.


3. A unique feature of utilizing simple yet robust statistical inferential techniques for weld signature analysis and defect identification.

4. This facility provides feasibility for online monitoring and diagnosis of CO₂ welding.

5. A software package provides an excellent mechanism for developing finger print templates that are indicative of a gamut of weld defects for varying process parameters.

6. WSA also serves as an excellent cross verification tool to assess the manual welder performance and quality assurance.

9.3 List of Publications from this Research


9.4 Scope for Further Research Work

1. The welding defects are to be identified on-line and the main focus of future work is to develop a Unified Welding Signature Analyzer (UWSA) which is compatible for all welding system.

2. Various welding defect signatures can be benchmarked for WSA to detect all defects.

3. A Welding Parameter Monitoring System [WPMS] can be incorporated with necessary sensors with necessary feedback controller to achieve defect free welding.

4. A system can be developed to incorporate with WSA to transmit the signatures using Wireless – Fidelity [Wi-Fi] / Internet to seek the expert opinion about the process behaviour.