A.MONTASER, O. MOSELHI. ***RFID indoor location identification for construction projects.*** *Gerontechnology 2012;11(2):91;* doi:10.4017/gt.2012.11.02.156.00 **Purpose** The purpose of this paper is to present an indoor location identification methodology using low cost passive Radio Frequency Identification (RFID) for construction projects. **Method** Location-aware information at construction sites is an emerging area, concerned with automating the delivery of spatial information on the location of materials, workforce, and equipment[1,2]. This spatial information can provide knowledge on construction project status. Most RFID localization literature focuses on deploying active RFID tags, which are expensive and aimed at indoor localization. It has been experimented with in operating buildings but not on construction jobsites and with a different time span. For this paper low cost passive RFID-tags were used. Using this methodology, a number of passive RFID tags are distributed onsite where work is progressing and the user, such as the field superintendent, carries a mobile RFID-reader. The indoor construction work-active area is divided into exclusive zones for tracking. Each passive RFID-tag is used as a reference point with known location (LANDMARK) within a predefined zone. The reference tag's known location is used to estimate the location of the user. The methodology uses Received Signal Strength Indicator (RSSI) as the main attribute for signal measurement to process the reader captured data. Two localization algorithms (Trilateration and Proximity) were used to identify the user location. After identifying the user's location, the user can take snapshots with a camera and write comments about onsite activities. The collected data will be then attached to the as-planned project schedule and related CAD drawings automatically at the identified location. This data is used to represent actual progress, which is then compared to as-planned baseline progress using earned value analysis. **Results & Discussion** An actual construction jobsite was used to build 5 test beds at different locations and different construction time spans. Experiments were conducted on the test beds to compare the results obtained from Trilateration and Proximity algorithms (*Figure 1*). The results shows mean error equals to 1m for Trilateration method with standard deviation of 0.4m and for Proximity method mean error equals to 1.76m with standard deviation of 0.5m. Indoor location identification could be utilized for tracking the project status.

References

1. Li N, Becerik-Gerber B. Performance-Based Evaluation of RFID-Based Indoor Location Sensing Solutions for the Built Environment. Advanced Engineering Informatics 2011;25(3):535-546; doi:10.1016/j.aei.2011.02.004
2. Chon HD, Jun S, Jung H, An SW. Using RFID for Accurate Positioning. Journal of Global Positioning Systems 2004;3(1-2):32-39; doi:10.5081/jgps.3.1.32

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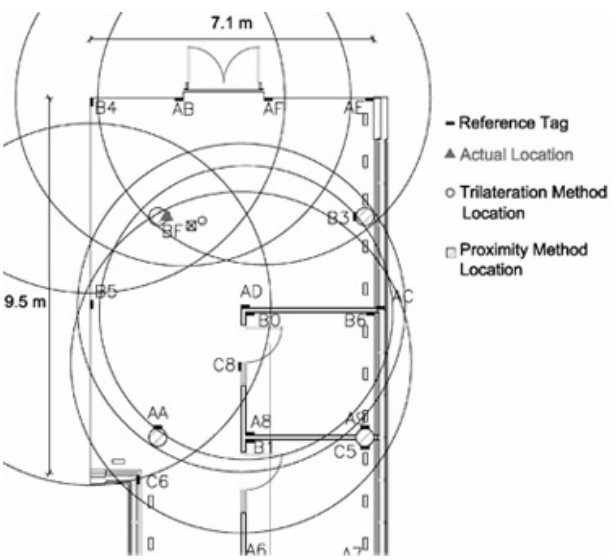

Figure 1. Test Bed #4, Experiment # 3