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Field Data Capture Reduces Cost by 73%

Intended Audience

This whitepaper is intended for an individual or group charged with the task of selecting an Enterprise system for their contracting or construction company. This individual or group may be in the early or late stages of platform selection and may be interested in analyzing how field based data capture is an integral part of any enterprise software platform.

Introduction

Singletouch builds enterprise software which can be deployed in the office, in vehicles and on job sites of any contracting or construction company who's business is focused on time, materials and equipment. In our experience, many contracting and construction companies are searching for an answer to the following question:

How can we reduce general and administrative costs?

The question arises from the basic need to increase revenue and margin. Singletouch software provides the answer to this question:

Deploy an effective field data collection system to enter information one time.

Singletouch has built and deployed a system where information is collected on a handheld device in the field by a foreman or trades person and uploaded to the Singletouch Enterprise system. A 73% general and administrative cost reduction was realized by a Singletouch client when field data collection was used in conjunction with our enterprise software.

The overall net effects of collecting data in the field include:

- Increased overall project margin
- Reduced time to invoice
- Reduced overhead costs
- Reduced data entry error rates
- Increased client satisfaction
- Improved "Bid Won/Loss" ratio due to ability to offer lower cost solution

The purpose of this document is to help the reader understand how much profit or cost saving can be realized by deploying Singletouch software in an organization (ROI).



Case Study: Cost Savings from Field Data Collection

Technology

Singletouch launched the first version of its field data collection software during a large project based in Northern Alberta and this initial launch included functions to capture time and attendance information.

Singletouch selected barcodes as the standard for efficient data collection over other standards such as RFID for the following reasons:

- Low production costs (e.g. printing ID cards)
- Abundance and low cost of hardware for reading barcodes
- Wide variety of media can be used (e.g. ID cards, stickers)
- Generally accepted and understood
- Flexible in application (e.g. materials, personnel, equipment)
- Client self-provisioning (Singletouch customers can manage and produce their own barcodes)

NOTE: The ID cards used in this case study were photo ID cards with barcode and magnetic strip. The magnetic strip contained the same code as the barcode and was read using the touch screen device

Singletouch also researched hardware options while building the field data collection software. The Intermec 730c was used for mobile data collection and the ELO E679933 was selected as the touch screen device.

Intermec 730c



Specifications

Transflective TFT all-light readable color display with LED backlight, 240x320 pixels, 89mm (3.5 in) diagonal, 64 K colors

Integrated barcode scanner

Operating Temp: -10° to 55° C (+14° to 131° F)

Environmental Protection: IP54 compliant

Drop Survival: Withstands 5 foot drop MIL-STD 810

Numeric keypad

Memory: 64 MB RAM, 2 GB Flash Card

Intel® XScale™ PXA255 Processor, 400 MHz
Microsoft Windows Mobile software for Pocket PC

Size: 178 mm (7.0 in.) X 89 mm (3.5 in.) X 38 mm (1.5 in.)
Weight: 420 grams (15 oz.)

Battery Life: 6-10 hours, 4 hours recharging time

ELO E679933



Specifications

High quality panel with 140°x127° viewing angle

Analog and digital (DVI-D) video inputs

Built-in speakers

AccuTouch Five-Wire Resistive Technology

Ergonomic 3 stripe Magnetic Strip Reader

Sealed touch screen

Controls on the side rather than the front, plus lockout function for public use

Multilingual on-screen display (OSD) with extras including speaker volume, treble, bass, and balance



Process

The case study comes from a mid-sized Industrial Electrical Contractor who deployed two handheld devices during the final stages of a large project. Once the project was completed, an analysis was done to calculate the total cost savings for the entire life of the project if handheld devices were deployed for each foreman.

The process in the field to capture labor information was as follows:

1. Foreman meets with crew (8 – 15 electricians) at beginning of shift for tool-box meeting
2. Foreman scans barcode on each crew members ID card and dismisses crew
3. Foreman joins crew on jobsite and completes shift
4. Foreman gathers crew at end of the shift - scans barcodes for each crew member
5. Foreman synchronizes device to central database and generates Time Tickets
6. Office personnel add Time Tickets to invoice which is sent out at the end of billing cycle
7. Office personnel exports payroll information to third party payroll application.

Two major exceptions to this process commonly occurred:

Crew members arrive onsite late.

Crew members leave site early.

In either case, a touch screen terminal with barcode or magnetic strip reader was accessible to capture the necessary information for generating time tickets.

User Acceptance and Training

Singletouch was surprised at the acceptance of this technology in the field. Singletouch personnel were onsite conducting the initial training and during the first week of production. Training combined process re-engineering, software training and hardware training. Initially the onsite portion of the training was to be conducted over 4 days however it was apparent that after only 2 days, the users were very comfortable with the new processes and technology.

As of October 11, 2007, there have been no issues with hardware and all data has successfully been collected and uploaded to the central enterprise database.



Automated Costs vs. Manual Costs

The first section of Figure 1 below uses the terms Automated Costs and Manual Costs. These terms are defined as:

Automated Costs - Costs (equipment and time) related to the process of capturing, uploading and processing labor information on a handheld device using barcoded ID cards.

Manual Costs - Costs (paper and time) related to the process of recording and inputting labor information using pen/paper and Excel spreadsheets with manual processes.

Assumptions

Because handheld devices were introduced during the project, some assumptions were used to calculate total cost savings. It is the opinion of Singletouch these assumptions are quite conservative and actual cost savings could be significantly higher. Please see Figure 2 for more information.

Observations

The following observations of the data can be made:

1. Although this was a large project involving 10 foreman and over 150 trades people, the same **economics apply for smaller scale projects** or even service work involving a single field worker.
2. Since this initial project, Singletouch has expanded the functionality of the handheld software to manage materials and equipment. It is logical to think that if the original project included the field capture of materials and equipment information, the **cost savings would have been significantly higher**.
3. The single largest cost saving item was **the total elimination of re-entering data**. The cost savings due to this are realized immediately after a field collection system is introduced.
4. The amount of time it takes a Foreman to complete a time sheet was **reduced by 56%** (see Fig. 2).
5. This system captures the "scan-in" time and "scan-out" time each time an ID card is scanned. The scan times provide an **audit trail which can be useful in dispute resolution**. If a customer disputes the number of hours worked because they suspect that the contractor is "padding" hours, the contractor now has data which supports their position.



Potential Cost Savings over Entire Course of Project:

	Automated Costs	Manual Costs
Employee Time Spent on Administrative Work:		
Hourly employee time spent signing in & out	47,034	94,068
Foreman time spent completing and authorizing timesheets	6,208	14,110
Admin time spent entering timesheets into Enterprise Software	-	81,540
Admin time spent re-entering information into Excel Spreadsheets for client	-	48,924
Admin time spent on correcting data entry errors	-	6,523
Admin time spent creating electronic ID cards	1,510	-
Material Costs:		
Cost of paper time cards	-	534
Cost of electronic handheld devices	6,500	-
Cost of ID card printer	4,200	-
Cost of electronic ID cards	150	-
Totals	65,602	245,699
Potential Cost Savings over Course of Project:		180,097

Cost Savings Analysis in Terms of Hours:

Total potential cost savings over project:	180,096.86
Average cost of an hourly employee (mix of admin & hourly)	41.23
= Total potential hours that could have been saved	4,368.1

Figure 1.

Automated Costs compared with Manual Costs for entire course of project using 10 handhelds including total projected Cost Savings



INPUT CELLS

Project and time assumptions:

Length of project in months (Sept 2006 to Aug 2007)	12
Length of project in days (Average 30 days per month)	360

Wage assumptions:

Average Hourly Employee Charge Out Rate	43.55
Foreman Charge Out Rate	52.26
Admin Staff Charge Out Rate	30.20

Employee time assumptions:

Hourly employees - average time spent to complete a manual timesheet (min)	2.00
Hourly employees - average time spent to swipe in & out (mins)	1.00
Foreman - Average time spent completing manual timesheets (hours) per day	0.75
Foreman - Average time spent completing automated timesheets (hours) per day	0.33
Admin - average time spent to enter and authorize a time card (mins)	2.50
Admin - average time spent to enter and balance employee info into Excel (mins)	1.50
Admin - average time to correct a payroll error (mins)	20.00
Admin - average time to create an electronic ID card (mins)	10.00

Payroll administration assumptions:

Approx Number of Pay Periods in the project	26
Average number of employees per pay period	180.00
Total number of employees employed on the project	300.00
Average number of working days in a pay period	14.00
Cost of an average sheet of paper	0.01
Payroll errors arising from data entry problems (%)	1%

Time entry hardware assumptions:

Total cost of handheld time-entry device	\$ 2,600.00
Average life of a handheld device (3-5 years)	4
Average cost of a handheld device per month	\$ 54.17
Estimated number of handheld devices that would have been used on Project	10
Total cost of one electronic ID card	\$ 0.50
Total cost of one ID card printer	\$ 4,200.00
Total number of ID card printers used during project	1

Savings analysis assumptions:

Total admin hours billed to client	
Total admin dollars billed to client	
Total admin hours paid to admin staff	650
Total admin dollars paid to admin staff	\$ 78,131.30

Figure 2.

Assumptions used to extrapolate the Automated Cost savings for project.



Conclusion

Singletouch has built and deployed a system which demonstrates a significant return on investment in the form of cost savings. In a single project, the cost savings realized by a field data collection system not only recovered the capital costs of equipment used, but also recovered significant costs of the entire enterprise software system used in the office.

Field data collection presents contracting and construction companies with a strategic advantage over competitors in two major respects:

1. The system increases profit margin by reducing the administration costs across the board in an organization which revolves around labor, materials and equipment
2. The system enables an organization to win more business by providing a lower cost solution due to reduced administration costs

Field data collection represents a significant opportunity for all construction and contracting organizations.