Innovation, Sciences et Développement économique Canada
Office de la Propriété Intellectuelle du Canada

Innovation, Science and Economic Development Canada
Canadian Intellectual Property Office

CA 2916503 C 2023/06/13

(11)(21) **2 916 503**

(12) **BREVET CANADIEN**
CANADIAN PATENT

(13) **C**

(22) **Date de dépôt/Filing Date:** 2015/12/30

(41) **Mise à la disp. pub./Open to Public Insp.:** 2017/03/09

(45) **Date de délivrance/Issue Date:** 2023/06/13

(30) **Priorité/Priority:** 2015/09/09 (US62/216,221)

(51) **Cl.Int./Int.Cl.** ***G06Q 10/0631*** (2023.01), ***G06Q 10/0639*** (2023.01), ***G06Q 50/08*** (2012.01)

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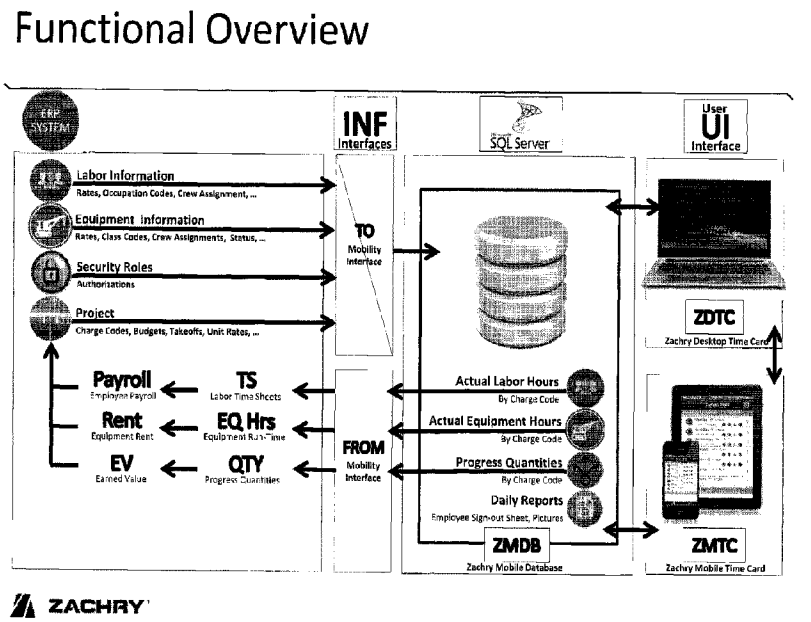
(54) **Titre : SYSTEMES DE PROJET DE TRAVAIL ET METHODES**
(54) **Title: WORK PROJECT SYSTEMS AND METHODS**



(57) **Abrégé/Abstract:**
Work project systems may include one or more server and client computers configured to enable project management personnel to create and modify work plans, to capture time worked by the relevant personnel, to capture run times of equipment assigned to each work project, and to capture work progress quantities of completed work. Labor and equipment time may be recorded for each person and piece of equipment, respectively, for each element of each activity of each project on a daily basis, and the progress toward completion of actuals with respect to the budget or the plan may be tracked and viewed. As work is performed each day, the actual time spent and quantity of work accomplished by each laborer and piece of equipment on each activity may be recorded, and the actual amounts may be compared to the corresponding budget and plan in real-time. Performance factors may be calculated and viewed.

ABSTRACT

Work project systems may include one or more server and client computers configured to enable project management personnel to create and modify work plans, to capture time worked by the relevant personnel, to capture run times of equipment assigned to each work project, and to capture work progress quantities of completed work. Labor and equipment time may be recorded for each person and piece of equipment, respectively, for each element of each activity of each project on a daily basis, and the progress toward completion of actuals with respect to the budget or the plan may be tracked and viewed. As work is performed each day, the actual time spent and quantity of work accomplished by each laborer and piece of equipment on each activity may be recorded, and the actual amounts may be compared to the corresponding budget and plan in real-time. Performance factors may be calculated and viewed.

WORK PROJECT SYSTEMS AND METHODS

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FIELD

[0002] This application relates generally to the field of work project systems and methods, and more specifically to systems and methods for planning, executing, and evaluating labor, equipment and progress of installed quantities on various work projects, such as construction projects, for example.

BACKGROUND

[0003] In the field of work project planning, execution, and evaluation, it is a challenge to timely and accurately keep track of labor and equipment usage along with the work progress quantities in a manner that is actually useful in managing tasks and budgets in connection with current work projects. Typically, in spite of very detailed work project planning and budgeting, the relevant information regarding usage of labor and equipment in performing the various tasks of work projects does not get captured or evaluated until well after a time at which it would have been useful to have in making a current work project more efficient. It would be a significant advancement in the art to provide a system and method by which labor and equipment usage along with the work progress quantities may be provided to work project managers in real-time with key performance indicators such as Performance Factor and Earned Value so that they may adjust schedules and resources as necessary or desirable to achieve more efficient execution of work projects.

SUMMARY

[0004] As described herein, work project systems may include one or more server and client computers configured to enable project management personnel to create and modify work plans, to capture time worked by the relevant personnel, to capture run times of equipment assigned to each work project, and to capture work progress quantities of completed work. Labor and equipment time may be recorded for each person and piece of equipment, respectively, for each element of each activity of each project on a daily basis, and the progress toward completion of actuals with respect to the budget or the plan may be tracked and viewed. Mobile client computers may be configured to enable timekeepers to enter, review, and submit time worked on a project remotely from their smartphones or other mobile devices on a daily basis. Supervisory personnel with the appropriate credentials may also review, edit, and submit the time entries made by the various timekeepers under their supervision. As work is performed each day, the actual time spent and quantity of work accomplished by each laborer and piece of equipment on each activity may be recorded via a mobile application and communicated to a central server computer, and the actual amounts may be compared to the corresponding budget and plan in real-time. A performance factor of actual to budget or actual to plan may be calculated to indicate the performance of each laborer or timekeeper (e.g., foreman of a work crew) with respect to the budget or the plan for each activity and overall across all activities. Similarly, equipment performance factors may be calculated on the basis of run time, quantity of work accomplished, or other suitable metric. The results of all laborers or timekeepers on a project may also be combined in order to show overall performance on a given day, week, or other time period on the project, or for a given activity within a project. The recorded labor and equipment hours may be multiplied by the applicable labor and equipment cost rates, respectively, in order to calculate the actual labor and equipment costs for each laborer, timekeeper, and equipment for each activity each

day, which may be displayed for appropriately credentialed personnel. Such labor and equipment performance and cost information may be displayed on the mobile client computers as numerical values, graphical indications (e.g., bar graphs, pie graphs, or the like), or other suitable indications.

[0005] In some embodiments, a work project system may include a server computer having a tangible computer readable medium with program instructions executable by the computer configured for: receiving labor data pertaining to a plurality of laborers, the labor data including a labor identifier and a labor role for each of the plurality of laborers; receiving equipment data pertaining to a plurality of equipment, the equipment data including an equipment identifier and an equipment role for each of the plurality of equipment; receiving work project data pertaining to a plurality of work projects, the work project data including a plurality of activities for each of the plurality of work projects; associating one or more of the plurality of laborers with each of the plurality of activities; associating one or more of the plurality of equipment with each of the plurality of activities; receiving actual time worked data at least once daily for each of the plurality of laborers, the actual time worked data being allocated to one or more of the plurality of activities; receiving actual run time data at least once daily for each of the plurality of equipment, the actual run time data being allocated to one or more of the plurality of activities; receiving actual work progress quantity data at least once daily for each of the plurality of laborers, the actual work progress quantity data being allocated to one or more of the plurality of activities; for each of the plurality of laborers, computing a labor earned value and a labor variance with respect to a budget for one or more of the plurality of activities using at least one of the actual time worked data and the actual work progress quantity data; for each of the plurality of laborers, computing a labor variance with respect to a plan for one or more of the plurality of activities using at least one of the actual time worked data and the actual work progress quantity data; for each of the plurality

of equipment, computing an equipment earned value and an equipment variance with respect to the budget for one or more of the plurality of activities using the actual run time data; and communicating the labor earned value, the labor variance with respect to the budget, the labor variance with respect to the plan, the equipment earned value, and the equipment variance to at least one mobile client computer at least once daily, wherein the communicating occurs in real-time following receipt of the actual time worked data, the actual run time data, and the actual work progress quantity data.

[0006] In some embodiments, a work project system may include a mobile client computer having a tangible computer readable medium with program instructions executable by the computer configured for: communicating actual time worked data for a plurality of laborers to a central server computer at least once daily, the actual time worked data being allocated to one or more of a plurality of activities; communicating actual run time data for a plurality of equipment to the central server computer at least once daily, the actual run time data being allocated to one or more of the plurality of activities; communicating actual work progress quantity data for the plurality of laborers to the central server computer at least once daily, the actual work progress quantity data being allocated to one or more of the plurality of activities; receiving from the central server computer at least once daily a labor earned value, a labor variance with respect to a budget, a labor variance with respect to a plan, an equipment earned value, and an equipment variance; and displaying the labor earned value, the labor variance with respect to the budget, the labor variance with respect to the plan, the equipment earned value, and the equipment variance in real-time following the communicating of the actual time worked data, the actual run time data, and the actual work progress quantity data.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Fig. 1 is a functional overview of a work project system.

[0008] Fig. 2 is a technical overview of the work project system of Fig. 1.

[0009] Fig. 3 is a table of contents of a desktop application computer program for the work project system of Fig. 1.

[00010] Fig. 4 is a timecard home screen shot of the desktop application computer program of Fig. 3.

[00011] Fig. 5 is a timecard entry screen shot of the desktop application computer program of Fig. 3.

[00012] Fig. 6 is another timecard entry screen shot of the desktop application computer program of Fig. 3.

[00013] Fig. 7 is a change timesheet status screen shot of the desktop application computer program of Fig. 3.

[00014] Fig. 8 is an add employee screen shot of the desktop application computer program of Fig. 3.

[00015] Fig. 9 is an add activity screen shot of the desktop application computer program of Fig. 3.

[00016] Fig. 10 is an add equipment screen shot of the desktop application computer program of Fig. 3.

[00017] Fig. 11 is a progress quantity screen shot of the desktop application computer program of Fig. 3.

[00018] Fig. 12 is a planning screen shot of the desktop application computer program of Fig. 3.

[00019] Fig. 13 is a reports menu screen shot of the desktop application computer program of Fig. 3.

[00020] Fig. 14 is a progress recap screen shot of the desktop application computer program of Fig. 3.

[00021] Fig. 15 is an employee weekly recap screen shot of the desktop application computer program of Fig. 3.

[00022] Fig. 16 is an employee weekly recap by timekeeper screen shot of the desktop application computer program of Fig. 3.

[00023] Fig. 17 is an employee weekly by WBS screen shot of the desktop application computer program of Fig. 3.

[00024] Fig. 18 is an equipment weekly recap screen shot of the desktop application computer program of Fig. 3.

[00025] Fig. 19 is an equipment weekly cost detail screen shot of the desktop application computer program of Fig. 3.

[00026] Fig. 20 is a cost report screen shot of the desktop application computer program of Fig. 3.

[00027] Fig. 21 is a timekeeper daily report screen shot of the desktop application computer program of Fig. 3.

[00028] Fig. 22 is an employee signout report screen shot of the desktop application computer program of Fig. 3.

[00029] Fig. 23 is a project assignment report screen shot of the desktop application computer program of Fig. 3.

[00030] Fig. 24 is a screen rendering of a printable time card.

[00031] Fig. 25 is a maintenance screen shot of the desktop application computer program of Fig. 3.

[00032] Fig. 26 is an administration screen shot of the desktop application computer program of Fig. 3.

[00033] Fig. 27 is a user definitions screen shot of the desktop application computer program of Fig. 3.

[00034] Fig. 28 is an opening screen shot of a mobile application computer program for the work project system of Fig. 1.

[00035] Fig. 29 is a login screen shot of the mobile application computer program of Fig. 28.

[00036] Fig. 30 is a setup and configuration screen shot of the mobile application computer program of Fig. 28.

[00037] Fig. 31 is a current week screen shot of the mobile application computer program of Fig. 28.

[00038] Fig. 32 is a home screen shot of the mobile application computer program of Fig. 28.

[00039] Fig. 33 is a charge codes screen shot of the mobile application computer program of Fig. 28.

[00040] Fig. 34 is an allocations screen shot of the mobile application computer program of Fig. 28.

[00041] Fig. 35 is a select activity screen shot of the mobile application computer program of Fig. 28.

[00042] Fig. 36 is an element search screen shot of the mobile application computer program of Fig. 28.

[00043] Fig. 37 is an employee allocations grid screen shot of the mobile application computer program of Fig. 28.

[00044] Fig. 38 is an equipment allocations grid screen shot of the mobile application computer program of Fig. 28.

[00045] Fig. 39 is an employee allocation screen shot of the mobile application computer program of Fig. 28.

[00046] Fig. 40 is another employee allocation screen shot of the mobile application computer program of Fig. 28.

[00047] Fig. 41 is an equipment allocation screen shot of the mobile application computer program of Fig. 28.

[00048] Fig. 42 is another equipment allocation screen shot of the mobile application computer program of Fig. 28.

[00049] Fig. 43 is an element list screen shot of the mobile application computer program of Fig. 28.

[00050] Fig. 44 is a quantity allocation screen shot of the mobile application computer program of Fig. 28.

[00051] Fig. 45 is an employee hours worked and allocation screen of the mobile application computer program of Fig. 28.

[00052] Fig. 46 is another employee hours worked and allocation screen of the mobile application computer program of Fig. 28.

[00053] Fig. 47 is an employee signout screen shot of the mobile application computer program of Fig. 28.

[00054] Fig. 48 is an equipment signout screen shot of the mobile application computer program of Fig. 28.

[00055] Fig. 49 is another equipment signout screen shot of the mobile application computer program of Fig. 28.

[00056] Fig. 50 is a daily log screen shot of the mobile application computer program of Fig. 28.

[00057] Fig. 51 is a timekeeper view daily cost by day screen shot of the mobile application computer program of Fig. 28.

[00058] Fig. 52 is another timekeeper view daily cost by day screen shot of the mobile application computer program of Fig. 28.

[00059] Fig. 53 is yet another timekeeper view daily cost by day screen shot of the mobile application computer program of Fig. 28.

[00060] Fig. 54 is an engineer view daily cost by day screen shot of the mobile application computer program of Fig. 28.

[00061] Fig. 55 is another engineer view daily cost by day screen shot of the mobile application computer program of Fig. 28.

[00062] Fig. 56 is yet another engineer view daily cost by day screen shot of the mobile application computer program of Fig. 28.

[00063] Fig. 57 is a submit screen shot of the mobile application computer program of Fig. 28.

[00064] Fig. 58 is another submit screen shot of the mobile application computer program of Fig. 28.

[00065] Fig. 59 is yet another submit screen shot of the mobile application computer program of Fig. 28.

[00066] Fig. 60 is a user definitions screen shot of the mobile application computer program of Fig. 28.

[00067] Fig. 61 is an icon definitions screen shot of the mobile application computer program of Fig. 28.

ABBREVIATIONS

[00068] As used herein, the following abbreviations should be understood to have the indicated meanings:

[00069] CATS: Cross Application Time Sheets, which is an SAP time sheet for entering labor time into SAP directly. If ERP software other than SAP is used, similar time

sheets or other labor entry means may be used.

[00070] ECC: Enterprise Central Component. An example of ECC software is that available from SAP SE (Walldorf, Germany).

[00071] ERP: Enterprise Resource Planning. An example of ERP software is that available from SAP SE (Walldorf, Germany).

[00072] ESB: Enterprise Service Bus, which is middleware that allows for a central place for various data sources to come into and go out of.

[00073] PBE: Performance Based Equipment, which provides a way to calculate "rent" for equipment based on performance, e.g., equipment used for 2 hrs. @ $50/hr. = $100 rent.

[00074] PF: Performance Factor, which is a ratio of actual hours and/or dollars to earned hours and/or dollars. PF = 1 means that work is being performed on budget; PF < 1 means that work is being performed under budget; and PF >1 means that work is being performed over budget.

[00075] WBS: Work Breakdown Structure, which is a unique cost code scheme.

[00076] ZEHOURS: a table in ERP/Mobile database where equipment run times (hours) entered by end users are stored.

[00077] ZMETERS: a table in ERP/Mobile database where equipment run time readings from electronic meters mounted on equipment are stored.

DEFINITIONS

[00078] As used herein, the following terms should be understood to have the indicated meanings:

[00079] When an item is introduced by "a" or "an," it should be understood to mean one or more of that item.

[00080] "Allocation" is the process of assigning the total labor hours actually worked,

equipment hours actually used, and work progress quantities actually completed into one or more charge codes (e.g., WBS, activity, and/or element). For example, in a 10 hour work day, if half the day was spent working on charge code 1 and the other half was spent on charge code 2, allocation may involve assigning one-half of the associated actual labor hours, equipment hours, and work progress quantities to each of the two charge codes. In some embodiments, work progress quantities may or may not be the same, even though time worked was the same. For example, the work progress could be 100 units for the first 5 hours, but 125 units for the second 5 hours.

[00081] "Budget" means a target cost and quantity of resources (labor, equipment, materials, etc.) assigned to a work project or an activity of a work project to complete a specified amount of work. Such target costs and quantities may be expressed in units of time (e.g., work hours), value (e.g., dollars), units of work (e.g., square feet (SF)), value per unit time (e.g., dollars/hour), unit of work per unit time (e.g., SF/hour), or other suitable units. A budget may be associated with a specified timeframe (e.g., day, week, month, year, the entire work project duration, or the like). On a work project, the budgets typically are set up and locked in at the beginning of the project and may be changed only through a change order process.

[00082] "Communication" means the transmission of one or more signals from one point to another point. Communication between two objects may be direct, or it may be indirect through one or more intermediate objects. Communication in and among computers, I/O devices and network devices may be accomplished using a variety of protocols. Protocols may include, for example, signaling, error detection and correction, data formatting and address mapping. For example, protocols may be provided according to the seven-layer Open Systems Interconnection model (OSI model), the TCP/IP model, or any other suitable model.

[00083] "Comprises" means includes but is not limited to.

[00084] "Comprising" means including but not limited to.

[00085] "Computer" means any programmable machine capable of executing machine-readable instructions. A computer may include but is not limited to a general purpose computer, mainframe computer, microprocessor, computer server, digital signal processor, personal computer (PC), personal digital assistant (PDA), laptop computer, desktop computer, notebook computer, smartphone (such as Apple's iPhone™, Motorola's Atrix™ 4G, and Research In Motion's Blackberry™ devices, for example), tablet computer, netbook computer, portable computer, portable media player with network communication capabilities (such as Microsoft's Zune HD™ and Apple's iPod Touch™ devices, for example), camera with network communication capability, wearable computer, point of sale device, or a combination thereof. A computer may comprise one or more processors, which may comprise part of a single machine or multiple machines.

[00086] "Computer readable medium" means an article of manufacture having a capacity for storing one or more computer programs, one or more pieces of data, or a combination thereof. A computer readable medium may include but is not limited to a computer memory, hard disk, memory stick, magnetic tape, floppy disk, optical disk (such as a CD or DVD), zip drive, or combination thereof.

[00087] "Earned Value" means the amount of budget (e.g., cost and/or quantity of resources, such as time or materials, for example) that should have been spent in order to accomplish an actual amount of work completed. Earned Value may be calculated based on percent complete, which may be determined as a ratio of actual quantity to budgeted quantity. For example, if a given activity was budgeted to take 10 hours to complete 100 units of work, but the work crew was able to complete the 100 units of work in only 8 hours, then the percent complete would be 100% (100 units actual / 100 units budgeted), the Earned Value

for that activity would be 10 hours (100% of the budget), and the PF for that activity would be 0.8 (8 hours actual / 10 hours earned). Similarly, if a given activity was budgeted to take 10 hours to complete 100 units of work, but the work crew was able to complete only 80 units of work in 10 hours, then the percent complete would be 80% (80 units actual / 100 units budgeted), the Earned Value for that activity would be 8 hours (80% of the budget), and the PF for that activity would be 1.25 (10 hours actual / 8 hours earned).

[00088] "GUI" means graphical user interface.

[00089] "Having" means including but not limited to.

[00090] "Interface" means a portion of a computer processing system that serves as a point of interaction between or among two or more other components. An interface may be embodied in hardware, software, firmware, or a combination thereof.

[00091] "I/O device" may comprise any hardware that can be used to provide information to and/or receive information from a computer. Exemplary I/O devices may include disk drives, keyboards, video display screens, mouse pointers, joysticks, trackballs, printers, card readers, scanners (such as barcode, fingerprint, iris, QR code, and other types of scanners), RFID devices, tape drives, touch screens, cameras, movement sensors, network cards, storage devices, microphones, audio speakers, styli and transducers, and associated interfaces and drivers.

[00092] "Laborer" means a person who performs work. A laborer may be an employee or an independent contractor. A laborer may or may not be a timekeeper as defined herein.

[00093] "Memory" may comprise any computer readable medium in which information can be temporarily or permanently stored and retrieved. Examples of memory include various types of RAM and ROM, such as SRAM, DRAM, Z-RAM, flash, optical disks, magnetic tape, punch cards, EEPROM, and combinations thereof. Memory may be

virtualized, and may be provided in or across one or more devices and/or geographic locations, such as RAID technology, for example.

[00094] "Module" means a portion of a program.

[00095] "Network" may comprise a cellular network, the Internet, intranet, local area network (LAN), wide area network (WAN), Metropolitan Area Network (MAN), other types of area networks, cable television network, satellite network, telephone network, public networks, private networks, wired or wireless networks, virtual, switched, routed, fully connected, and any combination and subnetwork thereof. A network may use a variety of network devices, such as routers, bridges, switches, hubs, repeaters, converters, receivers, proxies, firewalls, translators and the like. Network connections may be wired or wireless, and may use multiplexers, network interface cards, modems, ISDN terminal adapters, line drivers, and the like. A network may comprise any suitable topology, such as point-to-point, bus, star, tree, mesh, ring, and any combination or hybrid thereof.

[00096] "Plan" means a target cost and quantity of labor and/or equipment to be used on a work project or an activity of a work project. Such target costs and quantities may be expressed in units of time (e.g., work hours), value (e.g., dollars), units of work (e.g., square feet (SF)), value per unit time (e.g., dollars/hour), unit of work per unit time (e.g., SF/hour), or other suitable units. A plan may include specific personnel and equipment designated for performing the work of an activity or project. A plan may be associated with a specified timeframe (e.g., day, week, month, year, the entire work project duration, or the like). In comparison of budgets and plans, budgets generally are more static as they are typically locked in at the beginning of a work project and changed only pursuant to authorized change orders, whereas plans generally are more dynamic and may be created and changed independent of the budget throughout the specified timeframe.

[00097] "Program" may comprise any sequence of instructions, such as an algorithm,

for example, whether in a form that can be executed by a computer (object code), in a form that can be read by humans (source code), or otherwise. A program may comprise or call one or more data structures and variables. A program may be embodied in hardware, software, firmware, or a combination thereof. A program may be created using any suitable programming language, such as C, C++, Java, Perl, PHP, Ruby, SQL, other languages, and combinations thereof. Computer software may comprise one or more programs and related data. Examples of computer software may include system software (such as operating system software, device drivers and utilities), middleware (such as web servers, data access software and enterprise messaging software), application software (such as databases, video games and media players), firmware (such as software installed on calculators, keyboards and mobile phones), and programming tools (such as debuggers, compilers and text editors).

[00098] "Real-time" means a substantially simultaneous timeframe in which a computer system's activities substantially match the human perception of time.

[00099] "Signal" means a detectable physical phenomenon that is capable of conveying information. A signal may include but is not limited to an electrical signal, an electromagnetic signal, an optical signal, an acoustic signal, or a combination thereof.

[000100] "Timekeeper" means a person who is responsible for reporting time for one or more laborers, which may or may not include such person. For example, a foreman may be a timekeeper for his or her crew (including labor and equipment), and possibly also for himself or herself.

[000101] "Work Project Data" means data pertaining to a work project, such as charge codes, budgets, quantity takeoffs, unit rates, and the like.

DETAILED DESCRIPTION

[000102] As described herein, computerized systems and methods are provided for planning, executing, and evaluating labor, equipment, and work progress quantities used

on various work projects, such as construction projects, for example. Such systems and methods may provide a unique integrated solution which implements business processes electronically in a central database application and a mobile application. Such systems and methods may provide real-time, accurate information related to job costs in one convenient location for access by personnel in an organization's offices and in the field (e.g., at job sites).

[000103] For example, systems and methods described herein may enable users to:

[000104] 1. Plan daily work (e.g., via the desktop application zDTC described herein), which may include:

a. Assignment of labor and equipment to a foreman.

b. Assignment of charge codes (e.g., WBS, activity, and/or element) specific to the day.

c. Assignment of budgets, man hours, target work quantities, and daily production goals.

d. Carrying out of "what if" scenarios to optimize job cost based on either budgeted unit cost and/or past performance unit cost, and the ability to compare actuals to either the budget or the plan.

e. Pushing the plan to individual mobile devices.

[000105] 2. Capture daily information (e.g., via the mobile application zMTC or the desktop application zDTC described herein), which may include:

a. Ability to capture worked labor hours and also not worked hours, such as holidays, jury duty, sick leave, personal and vacation time, by each person.

b. Ability to sign electronically on the mobile devices and answer questions related to safety and other questions as required. Examples may include "were you injured today?", "did you get all your prescribed breaks today", or the like.

c. Capture of employee signature along with hours worked and automatic date, time and GPS location stamp.

d. Ability to capture equipment hours by each piece of equipment. Electronic meter readings may be fed into the mobile app from 3rd party web services, for example, to assist the foreman in determining equipment run time.

e. Ability to capture progress quantities of work done by charge code (e.g., WBS, activity, and/or element).

f. Ability to allocate labor hours, equipment hours, and work progress quantities to charge codes (e.g., WBS, activity, and/or element).

g. Ability to log daily reports.

h. Ability to view trade certifications by employee on the mobile app.

[000106] 3. Review daily or weekly cost and performance data (e.g., via the mobile application zMTC or the desktop application zDTC described herein), which may include:

a. Review of the performance of the crew on the device, in real-time, once hours and quantity allocations are entered. This may allow the foreman to see on the device in real-time where the crew performed better than, equal to, or worse than the budget and/or the plan.

b. Review of weekly performance as daily performance is stored for the foreman to review any time within a given period (e.g., a rolling 2-week period or other suitable period).

[000107] 4. Accumulate all daily capture information (e.g., via the desktop

application zDTC described herein), which may include:

a. Review and approval of all the various foremen's and their crews' times and progressed quantities.

b. Validation of the information and data with the central database (e.g., SAP ECC or other ERP software).

c. Uploading of labor time into the central database (e.g., SAP ECC or other ERP software) for payroll processing.

d. Uploading of equipment run time into the central database (e.g., SAP ECC or other ERP software) for equipment rent processing.

e. Uploading of progress quantities into the central database (e.g., SAP ECC or other ERP software) for earned value calculations.

[000108] 5. Run various reports to help improve accuracy of reporting and calculating job cost.

[000109] 6. Maintain laborer, equipment, and work progress photos, videos, and other records.

[000110] As persons of ordinary skill in the art will appreciate, systems and methods as described herein may provide more accurate and timely capture of labor and equipment usage data and may enable work project managers to make real-time labor and equipment adjustments in order to improve job performance on current jobs. Additionally, systems and methods as described herein may enable work project managers to make more accurate labor and equipment estimates for future jobs.

[000111] As shown in Figs. 1-2, a system and method for planning and capturing labor and equipment usage in real-time for work projects, such as construction projects, for example, may include a database application, such as SAP ECC or other ERP software, for example, configured to execute on a central server computer and a mobile application

configured to execute on mobile client computers, such as smartphones or tablets, for example. A file server may provide one or more interfaces for communication between the central server computer and the mobile client computers. In some embodiments, mobility source data may be communicated between the mobile client computers and the central server computer via a mobility source data server, such as a SQL server, for example. The database application may include data regarding laborers, equipment, timekeeper assignments, projects, user roles, maintenance orders, payroll, CATS, progress quantities, equipment PBE documents, ZEHOURS, and ZMETERS, for example. Equipment run time meter readings (e.g., via XacTrac) and equipment fuel usage readings (e.g., via OEM devices) may be communicated into the database application directly or via an ESB, for example. The mobile devices may be used to enter labor hours, work quantities, and equipment hours, which may be transmitted to the database application by suitable communication means (e.g., wireless network transmission). Additionally, various data from the central database application, such as data regarding laborers, equipment, timekeeper assignments, projects, user roles, maintenance orders, and ZMETERS, for example, may be provided to the mobile devices for viewing. With access to such data, users may also use the mobile devices to view various reports, such as labor recap, equipment recap, weekly cost, timekeepers' daily, and employee sign-out reports, for example. In some embodiments, users may also use the mobile devices with a web browser to review daily planning and desktop time entry, and to conduct review and approval of certain data entries made by other personnel. Access to certain data and reports may be controlled via appropriate user credentials. Persons of ordinary skill in the art will appreciate that the communication between the central computer and the mobile computers and equipment may be by any suitable means, such as wired or wireless network transmission (e.g., cellular or Internet).

[000112] As shown in Figs. 3-27, a desktop application zDTC may be

configured to enable project management personnel to create and modify work plans, to capture time worked by the relevant personnel, to capture run times of equipment assigned to each work project, and to capture work progress quantities of completed work. Labor and equipment time may be recorded for each laborer and piece of equipment, respectively, for each element of each activity of each project on a daily basis, and the progress toward completion of actuals with respect to the budget or the plan may be tracked and viewed.

[000113] As shown in Figs. 28-61, a mobile application zMTC may be configured to enable timekeepers to enter, review, and submit time worked by laborers on a project remotely from their smartphones or other mobile devices on a daily basis. Supervisory personnel with the appropriate credentials may also review, edit, and submit the time entries made by the various timekeepers under their supervision, as shown in Fig. 60, for example. The mobile application may include labor and equipment allocations, whereby each activity may be assigned a certain number of hours worked by certain laborers and a certain number of run time hours for each piece of equipment used for that activity. As work is performed each day, the actual time spent and quantity of work accomplished by each laborer and piece of equipment on each activity may be recorded via the mobile application and communicated to the central server computer, and the actual amounts may be compared to the corresponding budget and plan in real-time. As illustrated in Figs. 51-53, a performance factor PF of actual to budget or actual to plan may be calculated to indicate the performance of each laborer or timekeeper (e.g., foreman of a work crew) with respect to the budget or the plan for each activity and overall across all activities. Such labor or timekeeper performance factors may be calculated on the basis of time worked, or quantity of work accomplished (e.g., square feet of flooring installed, linear feet of fencing installed, miles of roadway paved, or the like), or other suitable metric. Similarly, equipment performance factors may be calculated on the basis of run time, quantity of work accomplished, or other

suitable metric. The results of all laborers or timekeepers on a project may also be combined in order to show overall performance on a given day, week, or other time period on the project, or for a given activity within a project. The recorded labor and equipment hours may be multiplied by the applicable labor and equipment cost rates, respectively, available in the database application in order to calculate the actual labor and equipment costs for each laborer, timekeeper, and equipment for each activity each day, which may be displayed for appropriately credentialed personnel as shown in Figs. 54-56. Such labor and equipment performance and cost information may be displayed on the mobile client computers as numerical values, graphical indications (e.g., bar graphs, pie graphs, or the like), or other suitable indications.

[000114] The mobile application may also include laborer and equipment signout procedures. For example, in some embodiments, the laborer signout procedure may include questions pertaining to employee safety and break compliance. The capture of such employee safety and break compliance data may help an employer defend against fraudulent claims of injury and failure to provide adequate breaks. The system may also capture GPS location from each mobile device at the time of signout, which may serve as a check on whether an employee or piece of equipment is actually at the proper work site. The system may also record the local weather conditions each day at each job site, which may serve as evidence of whether certain events may have been affected by the weather (e.g., job progress inhibited by adverse weather conditions), or whether certain claims made by personnel are likely to be substantiated in view of the local weather conditions at the job site on a given date.

[000115] Persons of ordinary skill in the art will appreciate that systems and methods as described herein are extremely useful for providing up-to-date performance information regarding actual labor and equipment time and costs compared to budgeted or

planned time and costs for various work projects. Such performance information may be provided at the laborer level, timekeeper level, work crew level, activity level, and/or overall project level. By providing such information to work project managers in real-time, they may readily determine whether work is progressing as expected and may make adjustments to the work plans as needed in order to achieve better work efficiencies. This is helpful not only with regard to current projects, but it also may greatly improve planning and budgeting for future projects.

[000116] It should be understood that one or more computers may be configured with proper programming on one or more computer readable media to perform the actions described herein. Each such computer may have one or more processors, memories, GUIs, interfaces, I/O devices, and communication devices. Although some actions are described as being performed on a central computer and other actions are described as being performed on a mobile computer, it should be understood that any action may be performed on any such computer. For example, in some embodiments, the mobile client computers may be "thin" clients, with most of the processing being done on one or more central computers. In other embodiments, a significant amount of processing may be performed on the mobile client computers. Persons of ordinary skill in the art will appreciate that the hardware, software, and database structure may be tailored to meet any desired applications.

[000117] The embodiments described above are some examples of the current invention. Various modifications and changes of the current invention will be apparent to persons of ordinary skill in the art. Among other things, any feature described for one embodiment may be used in any other embodiment, and methods described and shown in the figures may be combined. In addition, the order of steps shown in the figures and described above may be changed in different embodiments. The scope of the invention is defined by the appended claims and other claims that may be drawn to this invention, considering the

doctrine of equivalents, and is not limited to the specific examples described herein.

CLAIMS

WHAT IS CLAIMED IS:

1. A work project system comprising a server computer having a tangible computer readable medium with program instructions executable by the computer configured for:

receiving labor data pertaining to a plurality of laborers, said labor data comprising a labor identifier and a labor role for each of said plurality of laborers;

receiving equipment data pertaining to a plurality of equipment, said equipment data comprising an equipment identifier and an equipment role for each of said plurality of equipment;

receiving work project data pertaining to a plurality of work projects, said work project data comprising a plurality of activities for each of said plurality of work projects;

associating one or more of said plurality of laborers with each of said plurality of activities;

associating one or more of said plurality of equipment with each of said plurality of activities;

receiving actual time worked data at least once daily for each of said plurality of laborers, said actual time worked data being allocated to one or more of said plurality of activities;

receiving actual run time data at least once daily for each of said plurality of equipment, said actual run time data being allocated to one or more of said plurality of activities;

receiving actual work progress quantity data at least once daily for each of said plurality of laborers, said actual work progress quantity data being allocated to one or more of said plurality of activities;

for each of said plurality of laborers, computing a labor earned value and a labor variance with respect to a budget for one or more of said plurality of activities using at least one of said actual time worked data and said actual work progress quantity data;

for each of said plurality of laborers, computing a labor variance with respect to a plan for one or more of said plurality of activities using at least one of said actual time worked data and said actual work progress quantity data;

for each of said plurality of equipment, computing an equipment earned value and an equipment variance with respect to said budget for one or more of said plurality of activities using said actual run time data; and

communicating said labor earned value, said labor variance with respect to said budget, said labor variance with respect to said plan, said equipment earned value, and said equipment variance to at least one mobile client computer at least once daily, wherein said communicating occurs in real-time following receipt of said actual time worked data, said actual run time data, and said actual work progress quantity data.

2. The system of claim 1 wherein said actual time worked data, said actual run time data, and said actual work progress quantity data are further allocated to one or more charge codes.

3. The system of claim 1 wherein said program instructions executable by the computer are further configured for:

associating a timekeeper with a work crew comprising two or more of said plurality of laborers;

computing a performance factor associated with said work crew; and

communicating said performance factor to a mobile client computer associated with said timekeeper.

4. The system of claim 1 wherein said program instructions executable by the computer are further configured for:

computing a labor performance factor for each of said plurality of laborers based on said respective actual time worked data versus a time worked budget; and

communicating said labor performance factor to at least one mobile client computer at least once daily.

5. The system of claim 1 wherein said program instructions executable by the computer are further configured for:

computing an equipment performance factor based on said actual run time data versus a run time budget; and

communicating said equipment performance factor to at least one mobile client computer at least once daily.

6. The system of claim 1 wherein said program instructions executable by the computer are further configured for:

computing a labor performance factor based on said actual time worked data versus a time worked plan; and

communicating said labor performance factor to at least one mobile client computer at least once daily.

7. The system of claim 1 wherein said program instructions executable by the computer are further configured for:

associating a timekeeper with a work crew comprising two or more of said plurality of laborers;

computing a timekeeper performance factor for said work crew based on said actual work progress quantity data completed by said work crew versus a work quantity plan; and

communicating said timekeeper performance factor to at least one mobile client computer at least once daily.

8. The system of claim 1 wherein said program instructions executable by the computer are further configured for:

associating a timekeeper with a work crew comprising two or more of said plurality of laborers;

computing a timekeeper performance factor for said work crew based on said actual work progress quantity data completed by said work crew versus a work quantity budget; and

communicating said timekeeper performance factor to at least one mobile client computer at least once daily.

9. The system of claim 1 wherein said program instructions executable by the computer are further configured for:

computing an equipment performance factor based on said actual run time data versus a run time plan; and

communicating said equipment performance factor to at least one mobile client computer at least once daily.

10. The system of claim 1 wherein said communicating occurs in response to a request from said at least one mobile client computer.

11. A work project system comprising a mobile client computer having a tangible computer readable medium with program instructions executable by the computer configured for:

communicating actual time worked data for a plurality of laborers to a central server computer at least once daily, said actual time worked data being allocated to one or more of a plurality of activities;

communicating actual run time data for a plurality of equipment to said central server computer at least once daily, said actual run time data being allocated to one or more of said plurality of activities;

communicating actual work progress quantity data for said plurality of laborers to said central server computer at least once daily, said actual work progress quantity data being allocated to one or more of said plurality of activities;

receiving from said central server computer at least once daily a labor earned value, a labor variance with respect to a budget, a labor variance with respect to a plan, an equipment earned value, and an equipment variance; and

displaying said labor earned value, said labor variance with respect to said budget, said labor variance with respect to said plan, said equipment earned value, and said equipment variance in real-time following said communicating of said actual time worked data, said actual run time data, and said actual work progress quantity data.

12. The system of claim 11 wherein said program instructions executable by the computer are further configured for:

receiving a timekeeper performance factor associated with a work crew comprising two or more of said plurality of laborers; and

displaying said timekeeper performance factor.

13. The system of claim 12 wherein said timekeeper performance factor is based on at least one of said actual time worked data and said actual work progress quantity data.

14. The system of claim 13 wherein said timekeeper performance factor is with respect to said budget or said plan.

15. The system of claim 11 wherein said program instructions executable by the computer are further configured for:

receiving an equipment performance factor for each of said plurality of equipment; and

displaying said equipment performance factor.

16. The system of claim 15 wherein said equipment performance factor is based on at least one of said actual run time data and said actual work progress quantity data.

17. The system of claim 16 wherein said equipment performance factor is with respect to said budget or said plan.

18. The system of claim 11 wherein said program instructions executable by the computer are further configured for:

allowing a user to enter a change to said plan;

communicating said change to said central server computer;

receiving an updated work plan from said central server computer; and

displaying said updated work plan.

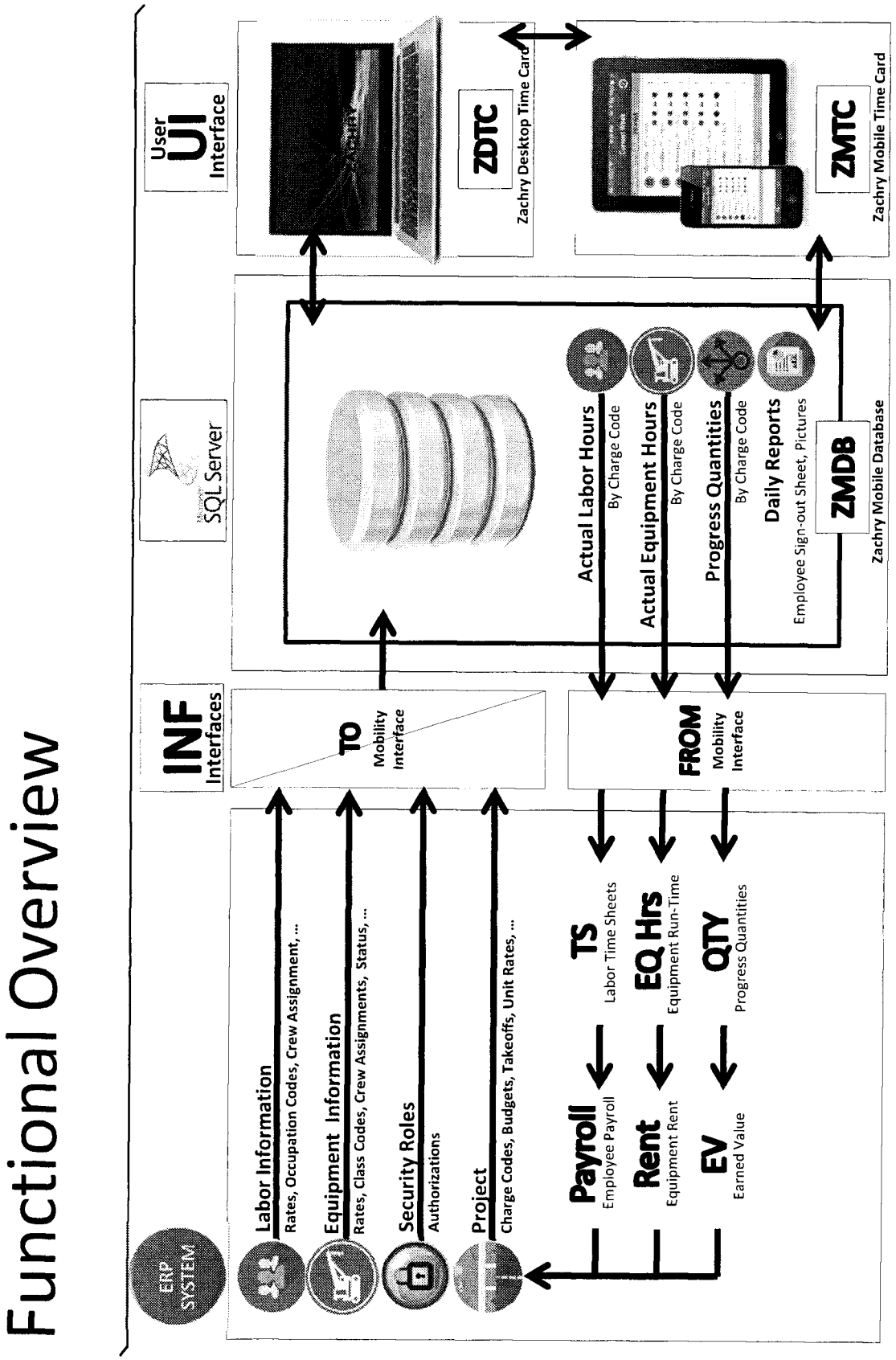
Functional Overview
ERP SYSTEM
Labor Information
Rates, Occupation Codes, Crew Assignment, ...
Equipment Information
Rates, Class Codes, Crew Assignments, Status, ...
Security Roles
Authorizations
Project
Charge Codes, Budgets, Takeoffs, Unit Rates, ...
INF Interfaces
TO Mobility Interface
FROM Mobility Interface
Payroll
Employee Payroll
Rent
Equipment Rent
EV
Earned Value
TS
Labor Time Sheets
EQ Hrs
Equipment Run-Time
QTY
Progress Quantities
Microsoft SQL Server
Actual Labor Hours
By Charge Code
Actual Equipment Hours
By Charge Code
Progress Quantities
By Charge Code
Daily Reports
Employee Sign-out Sheet, Pictures
ZMDB
Zachry Mobile Database
User UI Interface
ZDTC
Zachry Desktop Time Card
ZMTC
Zachry Mobile Time Card
ZACHRY

Fig. 1

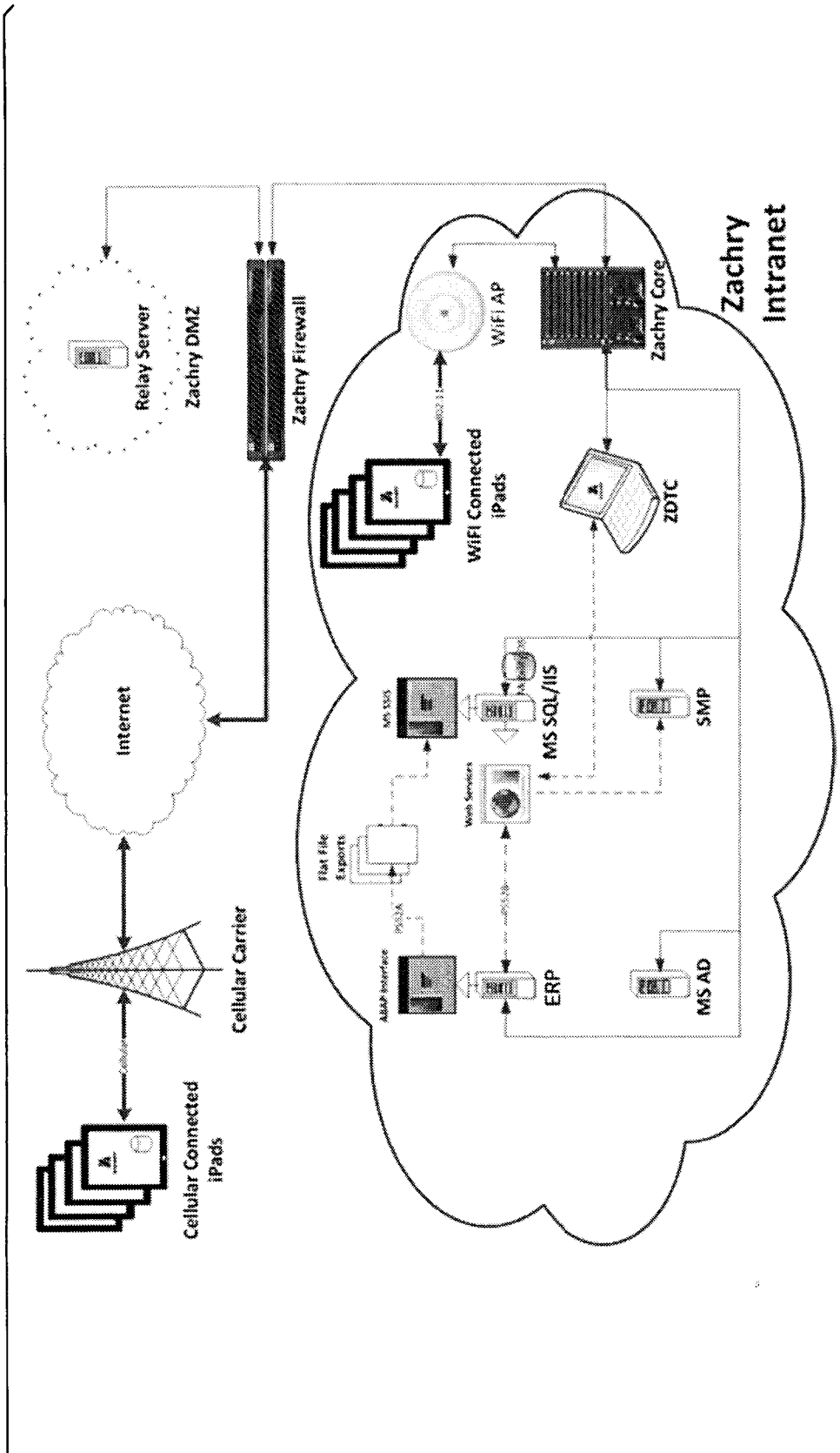
Technical Overview
Relay Server
Zachry DMZ
Zachry Firewall
Zachry Intranet
Wifi AP
Zachry Core
WiFi Connected iPads
ZDTC
Internet
MS SQL/IIS
SMP
Cellular Carrier
ERP
MS AD
Cellular Connected iPads
ZACHRY

Fig. 2

Table of Contents

Fig. 3

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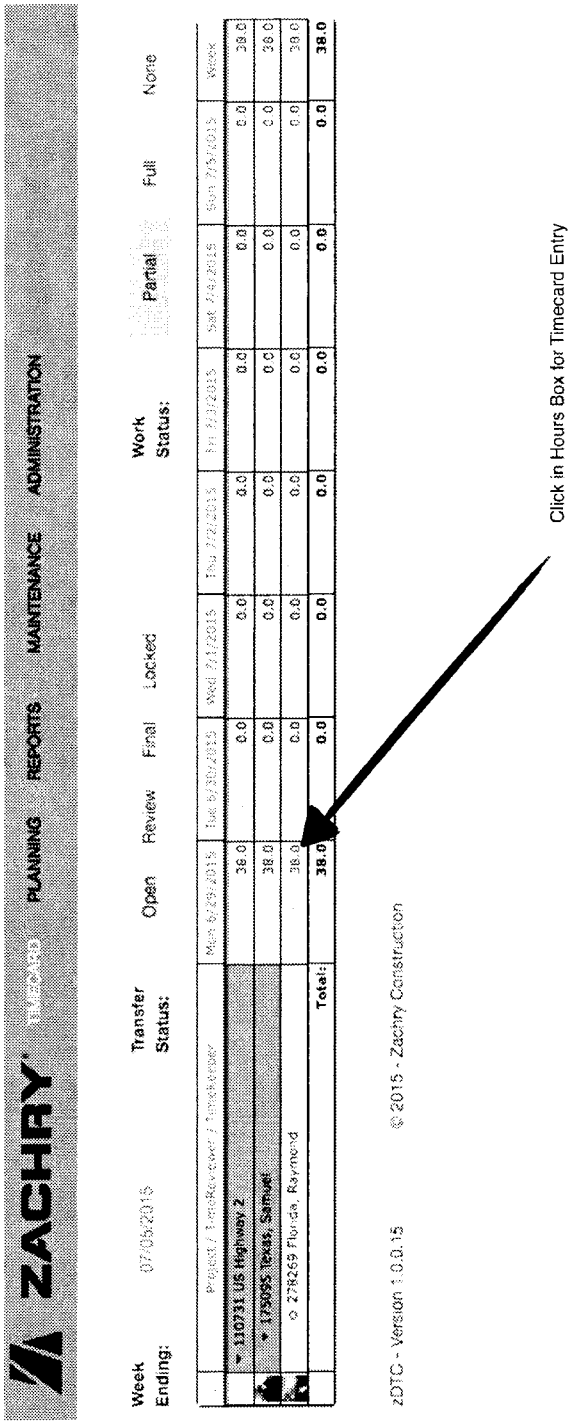

Timecard Home Screen for week
ZACHRY
TIMECARD
PLANNING
REPORTS
MAINTENANCE
ADMINISTRATION
Week Ending:
07/05/2015
Transfer Status:
Open
Review
Final
Locked
Work Status:
Partial
Full
None
Click in Hours Box for Timecard Entry
zDTC - Version 1.0.0.15
© 2015 - Zachry Construction

Fig. 4

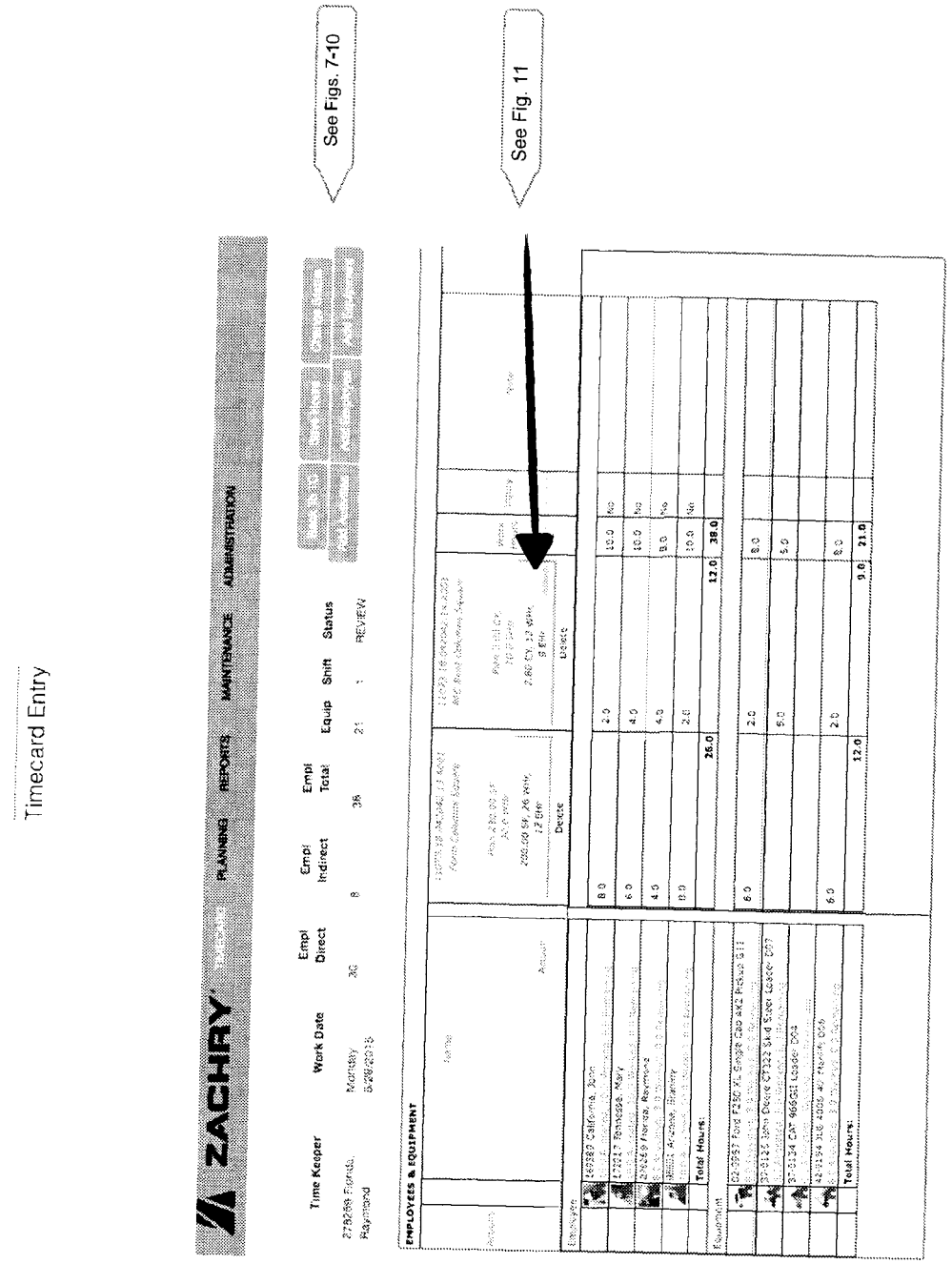
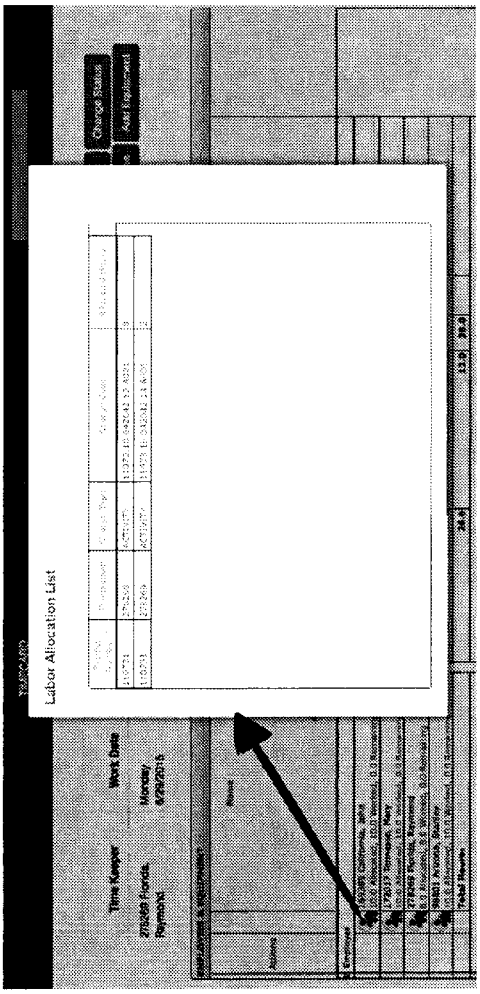

Timecard Entry
ZACHRY
PLANNING
REPORTS
MAINTENANCE
ADMINISTRATION
See Figs. 7-10
See Fig. 11
EMPLOYEES & EQUIPMENT
Type to enter text

Fig. 5

Timecard Entry



Click icon to see a list of all Allocations, including other time cards

Fig. 6

Change Status
Change Shift Number

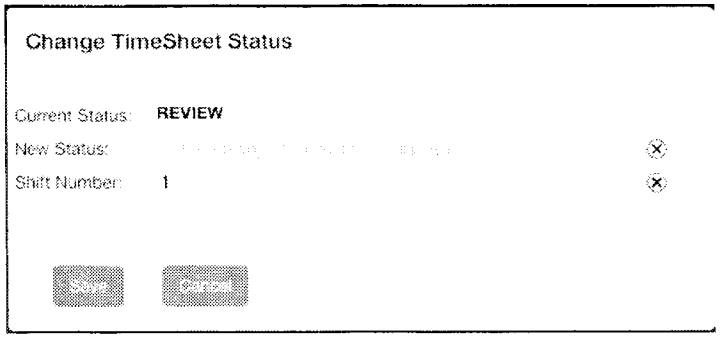


Fig. 7

Add Employee
Search by any Part of Name or EIN

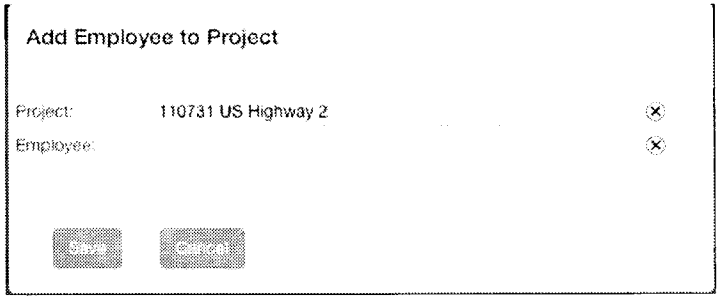


Fig. 8

Add Activity
Search by any Part of Name or Number

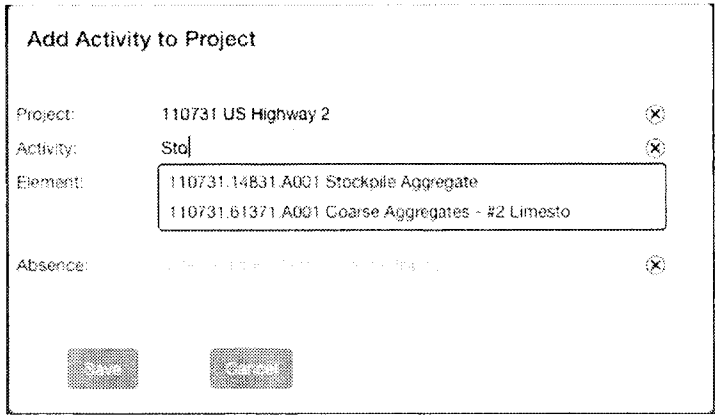


Fig. 9

Add Equipment
Search by any Part of Name or Number

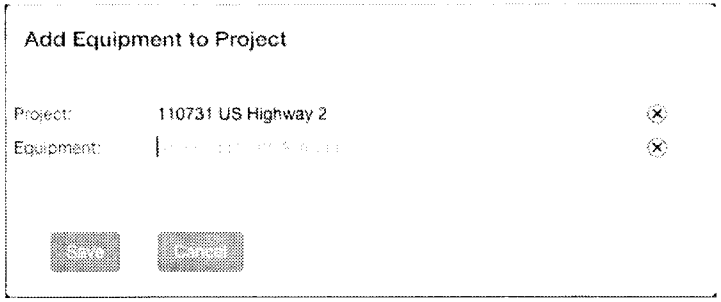


Fig. 10

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Progress Quantity

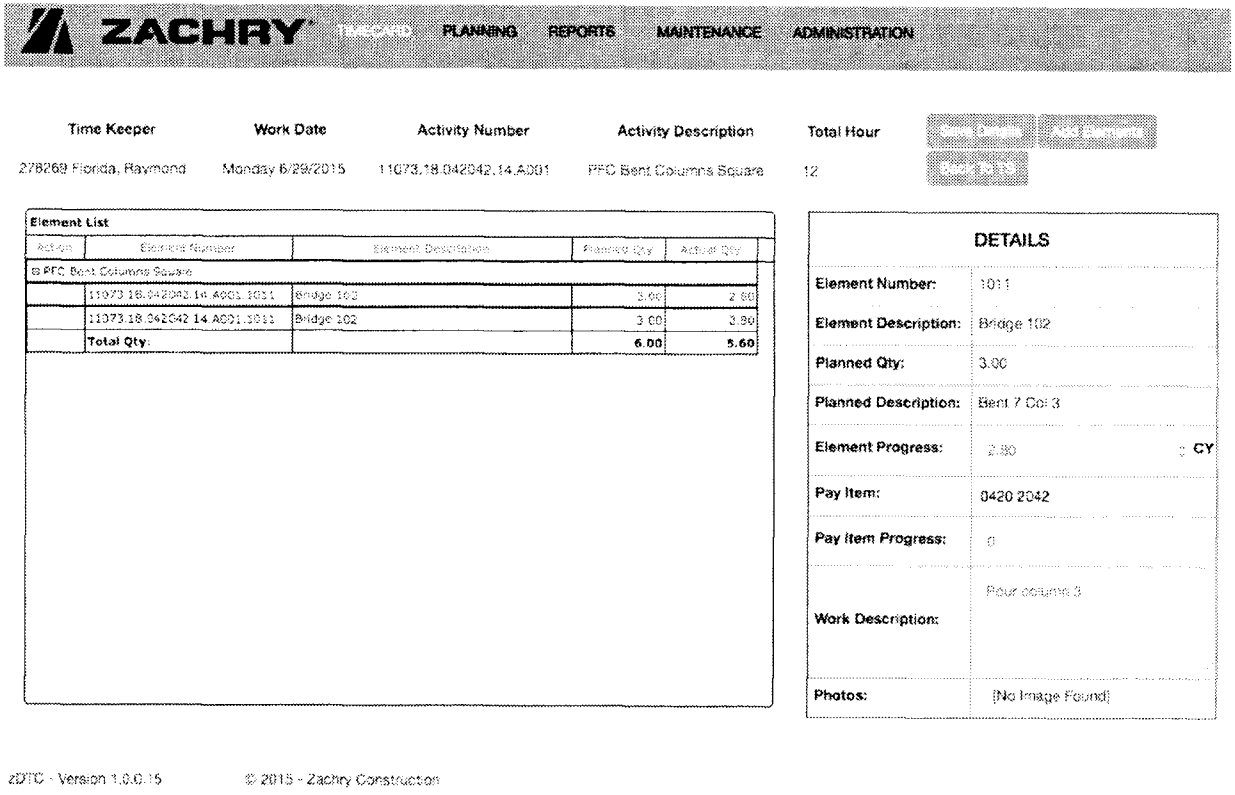


Fig. 11

CA 02916503 2015-12-30

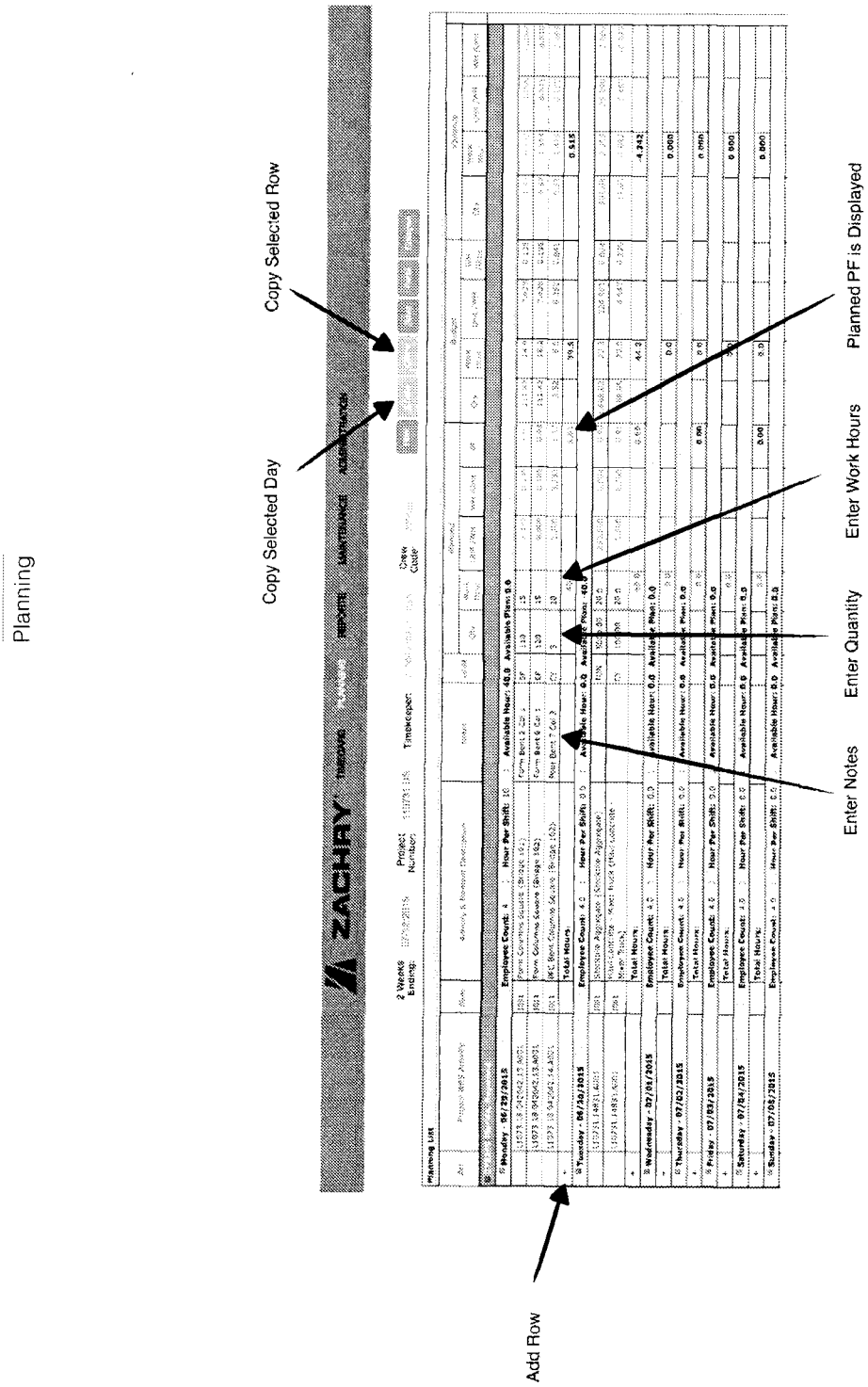

Planning
Copy Selected Row
Copy Selected Day
Add Row
Enter Notes
Enter Quantity
Enter Work Hours
Planned PF is Displayed

Fig. 12

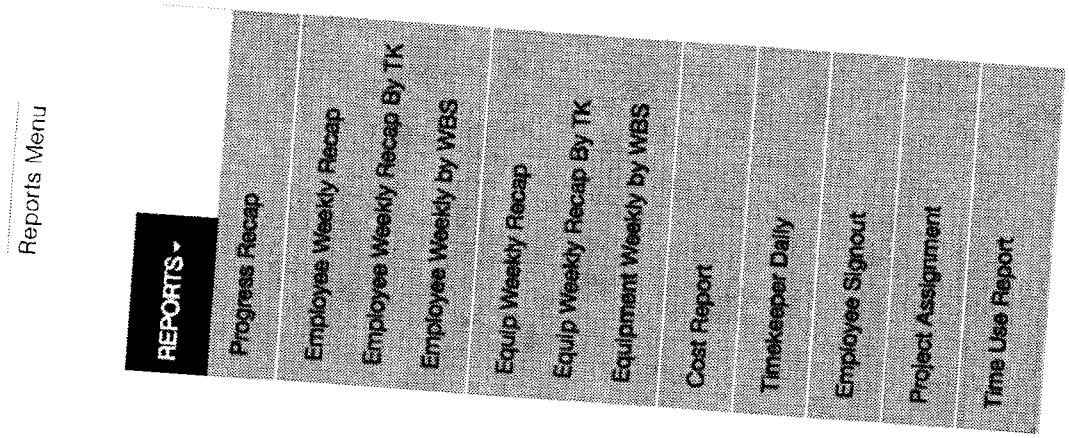

Reports Menu
REPORTS
Progress Recap
Employee Weekly Recap
Employee Weekly Recap By TK
Employee Weekly by WBS
Equip Weekly Recap
Equip Weekly Recap By TK
Equipment Weekly by WBS
Cost Report
Timekeeper Daily
Employee Signout
Project Assignment
Time Use Report

Fig. 13

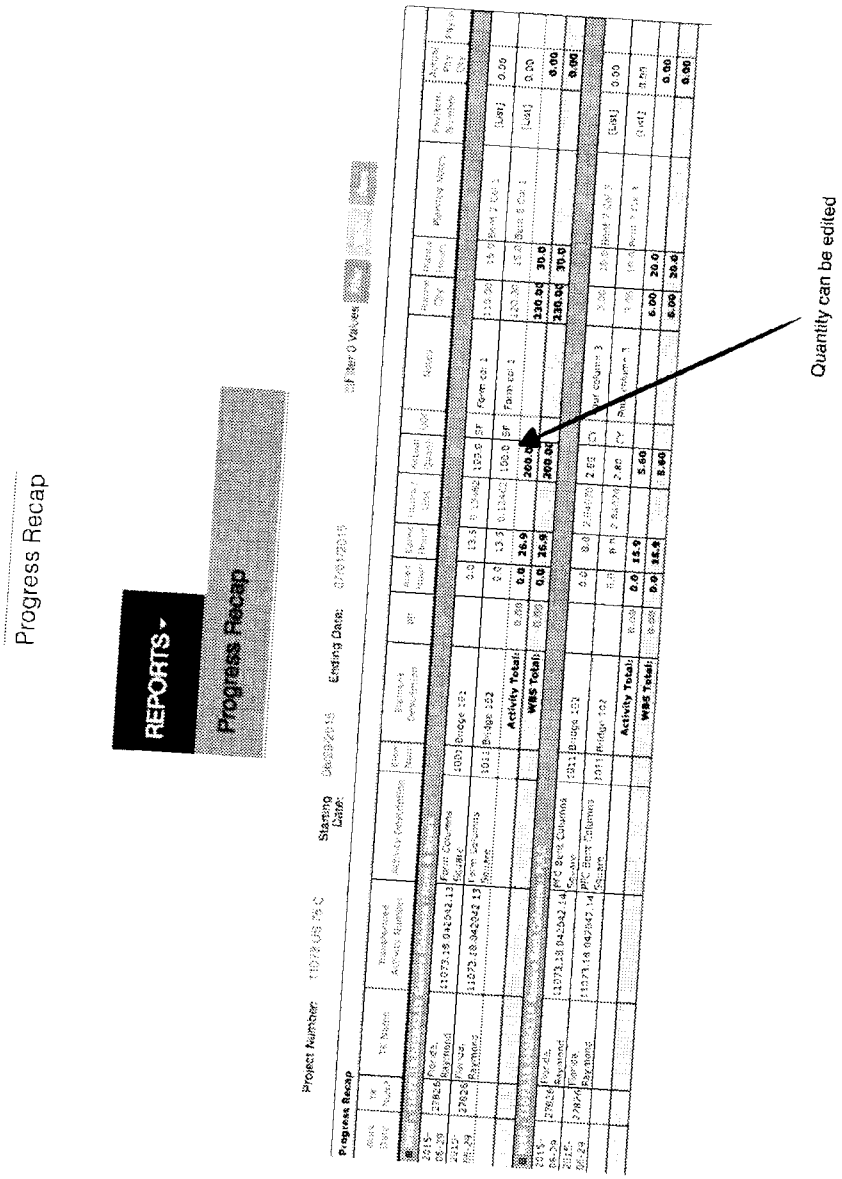

Progress Recap
REPORTS
Progress Recap
Quantity can be edited

Fig. 14

CA 02916503 2015-12-30

Employee Weekly Recap

Employee Weekly Recap

Employee Weekly Recap By TK

Employee Weekly Recap

Week Ending: Project:

Level: WBS Activity Absence

Employee Weekly Report **Week Ending : 07/05/2015**

110731 US Highway 2

T.C	T.C Name	WBS #	Description	Comments	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Hours
98801				**Adjusted Hours :**	**10.00**	**10.00**						**20.00**
				Signout Hours :	**10.00**	**10.00**						**20.00**
Arizona, Stanley												2.00
278269	Florida, Raymond	110731.18.042042.14	Square Bent Columns : P/C	590107	2.00							8.00
278269	Florida, Raymond	110731.18.042042.13	Square Columns : Form & Wreck	590107	8.00							10.00
278269	Florida, Raymond	110731.14831	Stockpile Aggregate	590107		10.00						**20.00**
				Total :	**10.00**	**10.00**						**20.00**
				Adjusted Hours :	**10.00**	**10.00**						**20.00**
169389				**Signout Hours :**	**10.00**	**10.00**						**2.00**
California, John												8.00
278269	Florida, Raymond	110731.18.042042.14	Square Bent Columns : P/C	503003	2.00							10.00
278269	Florida, Raymond	110731.18.042042.13	Square Columns : Form & Wreck	503003	8.00							**20.00**
278269	Florida, Raymond	110731.14831	Stockpile Aggregate	503003		10.00						**20.00**
				Total :	**10.00**	**10.00**						**20.00**
				Adjusted Hours :	**10.00**	**10.00**						**20.00**
172017				**Signout Hours :**	**10.00**	**10.00**						**10.00**
Tennesse, Mary												4.00
278269	Florida, Raymond	110731.14833	Haul Concrete : Mixer Truck	590889		10.00						6.00
278269	Florida, Raymond	110731.18.042042.14	Square Bent Columns : P/C	590889	4.00							**20.00**
278269	Florida, Raymond	110731.18.042042.13	Square Columns : Form & Wreck	590889	6.00							**8.00**
				Total :	**10.00**	**10.00**						**8.00**
				Adjusted Hours :	**6.00**	**8.00**						**16.00**
278269				**Signout Hours :**	**6.00**	**8.00**						**6.00**
Florida, Raymond												4.00
278269	Florida, Raymond	110731.14833	Haul Concrete : Mixer Truck	105497		8.00						4.00
278269	Florida, Raymond	110731.18.042042.14	Square Bent Columns : P/C	105497	4.00							**16.00**
278269	Florida, Raymond	110731.18.042042.13	Square Columns : Form & Wreck	105497	4.00							**16.00**
				Total :	**8.00**	**8.00**						

Fig. 15

Employee Weekly Recap By Timekeeper

Week Ending: Project:

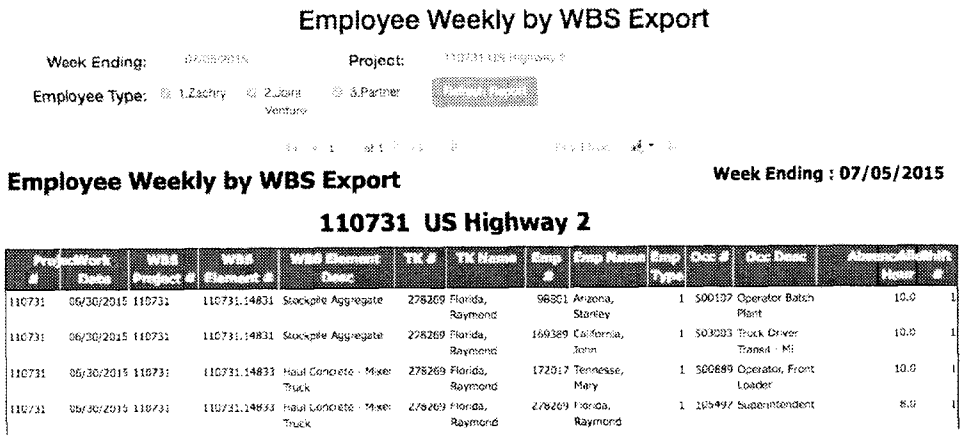
Level: WBS Activity Absence

Employee Weekly Report By Timekeeper **Week Ending : 07/05/2015**

110731 US Highway 2

T.C	T.C Name	WBS #	Description	Comments	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Hours
				Adjusted Hours :	**10.00**	**10.00**						**20.00**
Emp #: 98801				**Signout Hours :**	**10.00**	**10.00**						**20.00**
Name : Arizona, Stanley												2.00
278269	Florida, Raymond	110731.18.042042.14	Square Bent Columns : P/C	590107	2.00							8.00
278269	Florida, Raymond	110731.18.042042.13	Square Columns : Form & Wreck	590107	8.00							10.00
278269	Florida, Raymond	110731.14831	Stockpile Aggregate	590107		10.00						**20.00**
				Total :	**10.00**	**10.00**						**20.00**
				Adjusted Hours :	**10.00**	**10.00**						**20.00**
Emp #: 169389				**Signout Hours :**	**10.00**	**10.00**						**2.00**
Name : California, John												8.00
278269	Florida, Raymond	110731.18.042042.14	Square Bent Columns : P/C	503003	2.00							10.00
278269	Florida, Raymond	110731.18.042042.13	Square Columns : Form & Wreck	503003	8.00							**20.00**
278269	Florida, Raymond	110731.14831	Stockpile Aggregate	503003		10.00						**20.00**
				Total :	**10.00**	**10.00**						**20.00**
				Adjusted Hours :	**10.00**	**10.00**						**20.00**
Emp #: 172017				**Signout Hours :**	**10.00**	**10.00**						**10.00**
Name : Tennesse, Mary												4.00
278269	Florida, Raymond	110731.14833	Haul Concrete : Mixer Truck	590889		10.00						6.00
278269	Florida, Raymond	110731.18.042042.14	Square Bent Columns : P/C	590889	4.00							**20.00**
278269	Florida, Raymond	110731.18.042042.13	Square Columns : Form & Wreck	590889	6.00							**8.00**
				Total :	**10.00**	**10.00**						**8.00**
				Adjusted Hours :	**6.00**	**8.00**						**16.00**
Emp #: 278269				**Signout Hours :**	**6.00**	**8.00**						**16.00**
Name : Florida, Raymond												6.00
278269	Florida, Raymond	110731.14833	Haul Concrete : Mixer Truck	105497		8.00						4.00
278269	Florida, Raymond	110731.18.042042.14	Square Bent Columns : P/C	105497	4.00							4.00
278269	Florida, Raymond	110731.18.042042.13	Square Columns : Form & Wreck	105497	4.00							**16.00**
				Total :	**8.00**	**8.00**						

Fig. 16



Employee Weekly by WBS Export

Week Ending: [illegible] Project: [illegible]

Employee Type: 1.Zachry 2.Joint Venture 3.Partner [illegible]

Employee Weekly by WBS Export **Week Ending : 07/05/2015**

110731 US Highway 2

Pay Period # / Pay Date	WBS Project #	WBS Element #	WBS Element Desc	TK #	TK Name	Emp #	Emp Name	Emp Type	Occ #	Occ Desc	Regular Hours	Regular Rate #
110731	06/30/2015	110731	110731.14831	Stockpile Aggregate	278269	Florida, Raymond	98801	Arizona, Stanley	1	S00107	Operator Batch Plant	10.0	1
110731	06/30/2015	110731	110731.14831	Stockpile Aggregate	278269	Florida, Raymond	169389	California, John	1	S03003	Truck Driver Transit - Mi	10.0	1
110731	06/30/2015	110731	110731.14833	Haul Concrete - Mixer Truck	278269	Florida, Raymond	172017	Tennessee, Mary	1	S00689	Operator, Front Loader	10.0	1
110731	06/30/2015	110731	110731.14833	Haul Concrete - Mixer Truck	278269	Florida, Raymond	278269	Florida, Raymond	1	165497	Superintendent	8.0	1

Fig. 17

Equipment Weekly Recap

Week Ending: [illegible] Project: [illegible]

Level: WBS Activity

Equipment Weekly Recap **Week Ending: 07/05/2015**

110731 US Highway 2

02-0937	**Meter Start : 0 Meter End : 0 Diff : 0**				**Meter Reading :**								
Ford F350 XL Single Cab 4X2 Pickup G11					**Signout Hours :**	**8.00**							**8.00**
	278269 Florida, Raymond		110731.14833	Haul Concrete - Mixer Truck			4.00						4.00
	278269 Florida, Raymond		11073.18.042042.14	Square Bent Columns : P,F,C		2.00							2.00
	278269 Florida, Raymond		11073.18.042042.13	Square Columns : Form & Wreck		6.00							6.00
					Total :	**8.00**	**4.00**						**12.00**
37-0125	**Meter Start : 0 Meter End : 0 Diff : 0**				**Meter Reading :**								
John Deere CT322 Skid Steer Loader D07					**Signout Hours :**	**5.00**							**5.00**
	278269 Florida, Raymond		11073.18.042042.14	Square Bent Columns : P,F,C		5.00							5.00
					Total :	**5.00**							**5.00**
37-0134	**Meter Start : 0 Meter End : 0 Diff : 0**				**Meter Reading :**								
CAT 966GII Loader D04					**Signout Hours :**								
	278269 Florida, Raymond		110731.14831	Stockpile Aggregate			7.00						7.00
					Total :		**7.00**						**7.00**
42-0154	**Meter Start : 0 Meter End : 0 Diff : 0**				**Meter Reading :**								
JLG 400S 40' Manlift D06					**Signout Hours :**	**8.00**							**8.00**
	278269 Florida, Raymond		11073.18.042042.14	Square Bent Columns : P,F,C		2.00							2.00
	278269 Florida, Raymond		11073.18.042042.13	Square Columns : Form & Wreck		6.00							6.00
					Total :	**8.00**							**8.00**
					Grand Total :	**29.00**	**11.00**						**40.00**

Fig. 18

CA 02916503 2015-12-30

Equipment Weekly Cost Detail

Equipment Weekly Cost Detail

Week Ending: 07/05/2015

Equipment Number	Work Date	Project Number	WBS Element Number	WBS Element Description	Timekeeper Personnel Number	Employee Personnel Name	Equipment Number	Equipment Description	Capture Method	Capture Method Description	Total Allocated Hours	Total Actual Cost
02-0957												
	6/29/2015	110731	110731.18.092042.13	Square Columns : Form & Wreck	278269	Florica, Raymond	02-0957	Ford F250 XL Single Cab 4X2 Pickup G11			6.0	60.00
	6/29/2015	110731	110731.18.092042.14	Square Bent Columns : P,T,C	278269	Florica, Raymond	02-0957	Ford F250 XL Single Cab 4X2 Pickup G11			2.0	20.00
	6/30/2015	110731	110731.14833	Haul Concrete - Mixer Truck	278269	Florica, Raymond	02-0957	Ford F250 XL Single Cab 4X2 Pickup G11			4.0	40.00
										Total	12.0	120.00
20-0074												
	7/5/2015	110731	110731.8888	Equipment Standby Default	278269	Florica, Raymond	20-0074	IR P185WJD 185 CFM Air Comp D06	5	Standby	40.0	480.00
										Total	40.0	480.00
37-0125												
	6/29/2015	110731	110731.18.092042.14	Square Bent Columns : P,T,C	278269	Florica, Raymond	37-0125	John Deere CT322 Skid Steer Loader D07			5.0	75.00
	7/5/2015	110731	110731.8888	Equipment Standby Default	278269	Florica, Raymond	37-0125	John Deere CT322 Skid Steer Loader D07	5	Standby	35.0	525.00
										Total	40.0	600.00
37-0134												
	6/30/2015	110731	110731.14853	Stockpile Aggregate	278269	Florica, Raymond	37-0134	CAT 966GII Loader D09			8.0	280.00
	7/5/2015	110731	110731.8888	Equipment Standby Default	278269	Florica, Raymond	37-0134	CAT 966GII Loader D09	5	Standby	32.0	1,320.00
										Total	40.0	1600.00
42-0154												
	6/29/2015	110731	110731.18.092042.13	Square Columns : Form & Wreck	278269	Florica, Raymond	42-0154	JLG 400S 40' Man Lift D06			6.0	120.00
	6/29/2015	110731	110731.18.092042.14	Square Bent Columns : P,T,C	278269	Florica, Raymond	42-0154	JLG 400S 40' Man Lift D06			2.0	40.00
										Total	8.0	160.00
								Timecard Total			32.0	635.00
								Follow Labor Total			0.0	$0.00
								Default WBS Element Total			0.0	$0.00
								Attach / Follow Parent Total			0.0	$0.00
								Utilized Total			32.0	$635.00
								Standby Total	20		652.0	$1,985.19
								Total			820.0	$5,390.33

Fig. 19

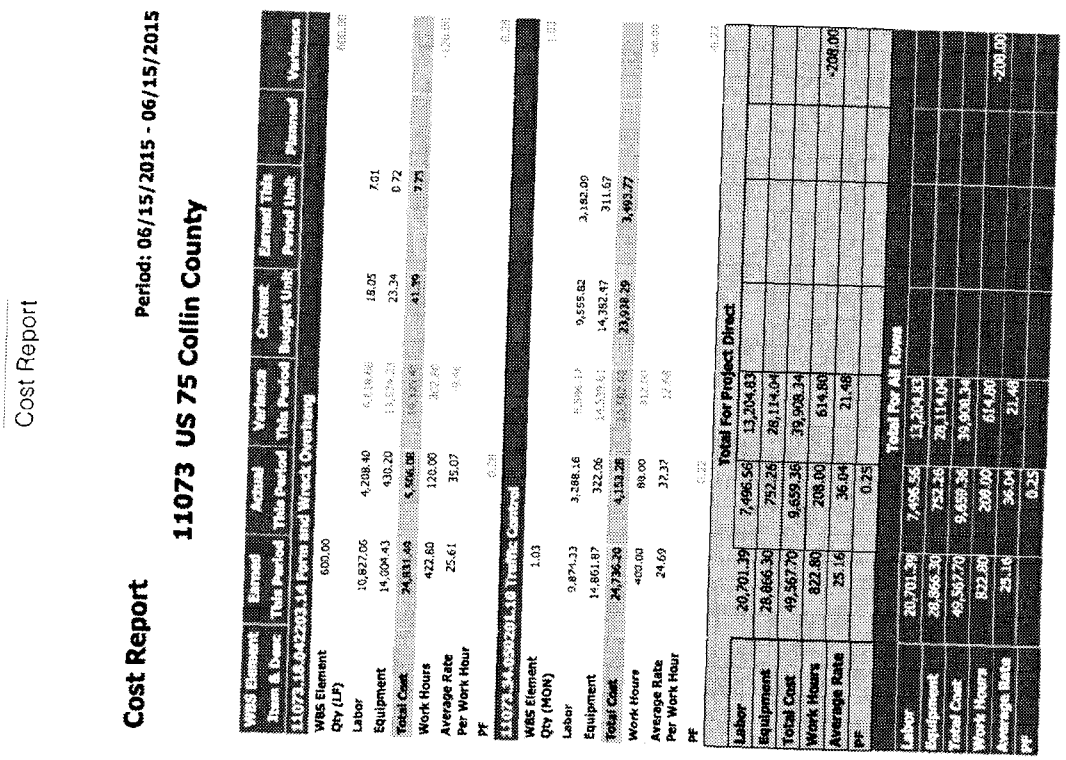

Cost Report
Cost Report
Period: 06/15/2015 - 06/15/2015
11073 US 75 Collin County
Total For Project Direct
Total For All Rows

Fig. 20

Timekeeper Daily Report

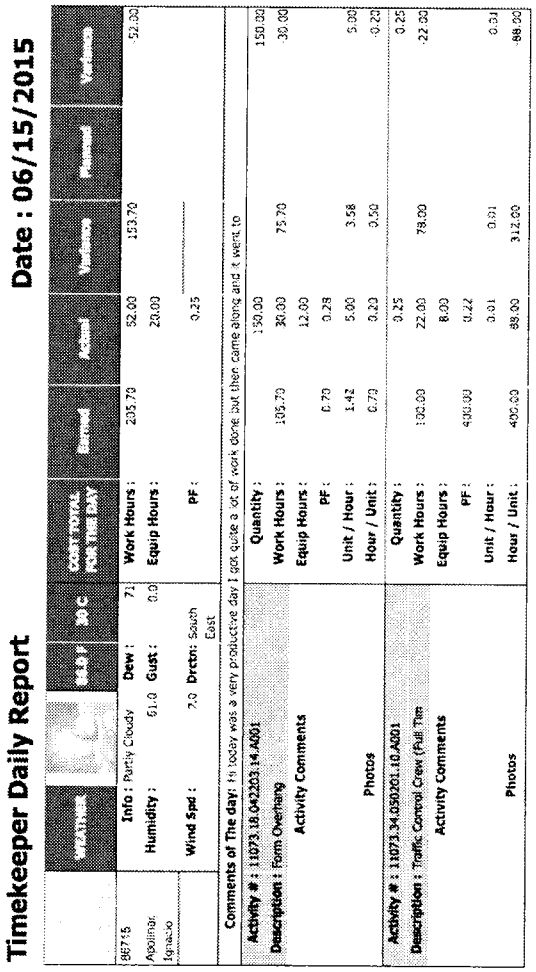


Fig. 21

Employee Signout Report

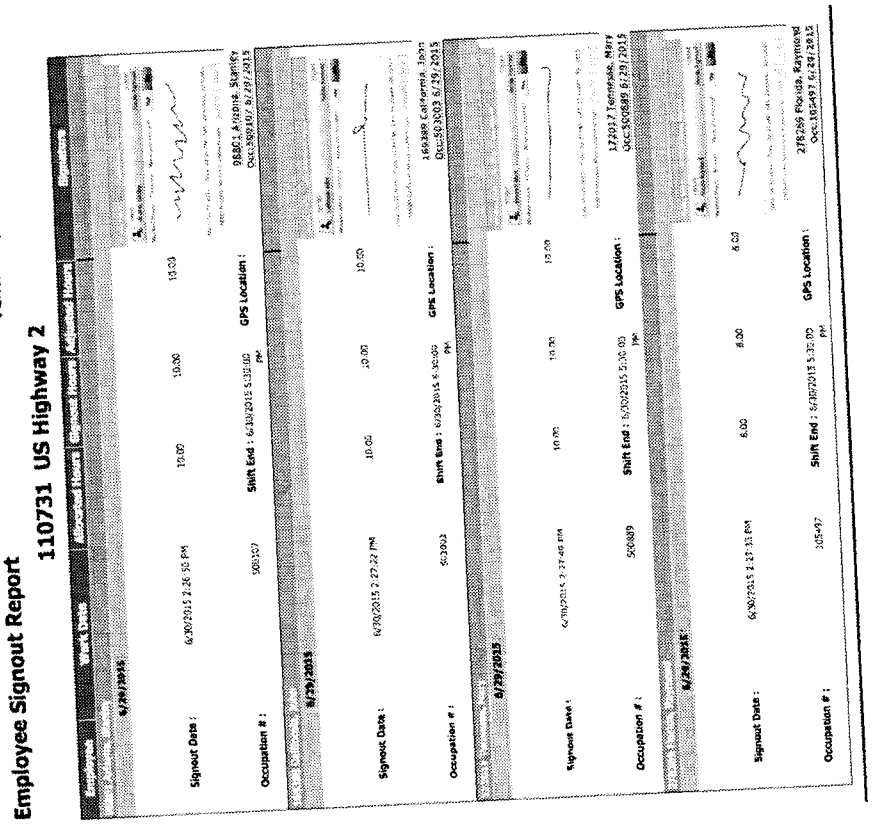


Fig. 22

Project Assignment Report

110731 - US Highway 2

Empl #	Employee Name	Role #	Description	Username	Valid From	Valid To
278269	Florida, Raymond	ds	discipline superintendent	SMITHJO	12/29/2014	12/31/9999
175095	Texas, Samuel	pe	project engineer	TALUCCIS	12/29/2014	12/31/9999
278269	Florida, Raymond	tk	timekeeper project	SMITHJO	12/29/2014	12/31/9999

Code	Name	Occupation / Status	Valid From	Valid To
Timekeeper:	Florida, Raymond	Field Engineer: Texas, Samuel	Superintendent:	

169389	California, John	Truck Driver Transit - Mi	12/29/2014	12/31/9999
172017	Tennesse, Mary	Operator, Front Loader	12/29/2014	12/31/9999
278269	Florida, Raymond	Superintendent	12/29/2014	12/31/9999
98801	Arizona, Stanley	Operator Batch Plant	12/29/2014	12/31/9999

02-3957	Ford F250 XL Single Cab 4X2 Pickup G11	Available - working condition	12/25/2014	12/31/9999
37-0125	John Deere CT322 Skid Steer Loader D07	In Use	12/25/2014	12/31/9999
37-0134	CAT 966GII Loader D04	In Use	12/25/2014	12/31/9999
42-0154	JLG 400S 40' Manlift D06	Available - working condition	05/25/2015	12/31/9999

11073	US 75 Collin County
110731	US Highway 2

Fig. 23

CA 02916503 2015-12-30

Time Use Report

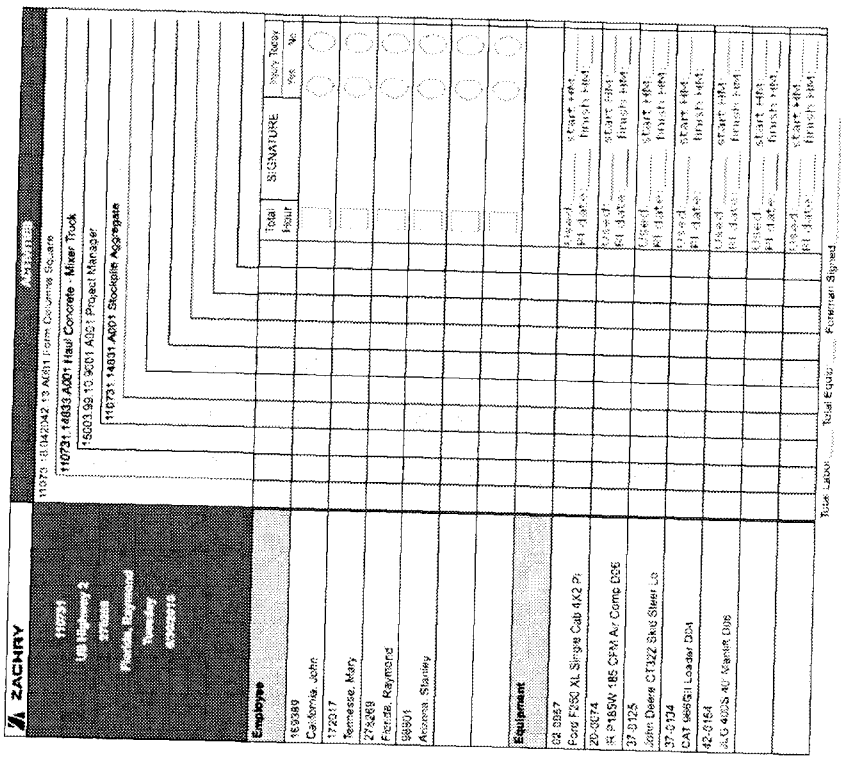
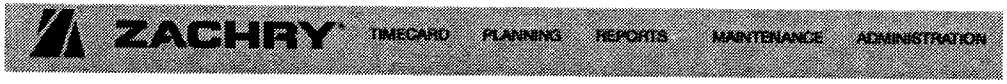


Fig. 24



Maintenance List

- Employee Photo
- Equipment Photo by Plate
- Equipment Photo by Class

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Fig. 25

CA 02916503 2015-12-30

Administration

Fig. 26

CA 02916503 2015-12-30

CHANGE

Time Keeper -

Can only see and edit their Time

Submit (Open to Review)

Field Engineer -

Can See and Edit his assigned Time Keepers

Submit (Open to Review)
Submit (Review to Final)
Submit (Review back to Open)

Project Engineer -

Can See and Edit All Time Keepers

Submit (Open to Review)
Submit (Review to Final)
Submit (Review back to Open)

Payroll Admin -

Can See and Edit All Time Keepers

Submit (Open to Review)
Submit (Review to Final)
Submit (Final back to Review)
Submit (Review back to Open)

DISPLAY

Discipline Superintendent -

Can Only See his assigned Time Keepers

Project Manager - (Project Manager / Superintendent)

Can View all Time Keepers

Fig. 27

zMTC

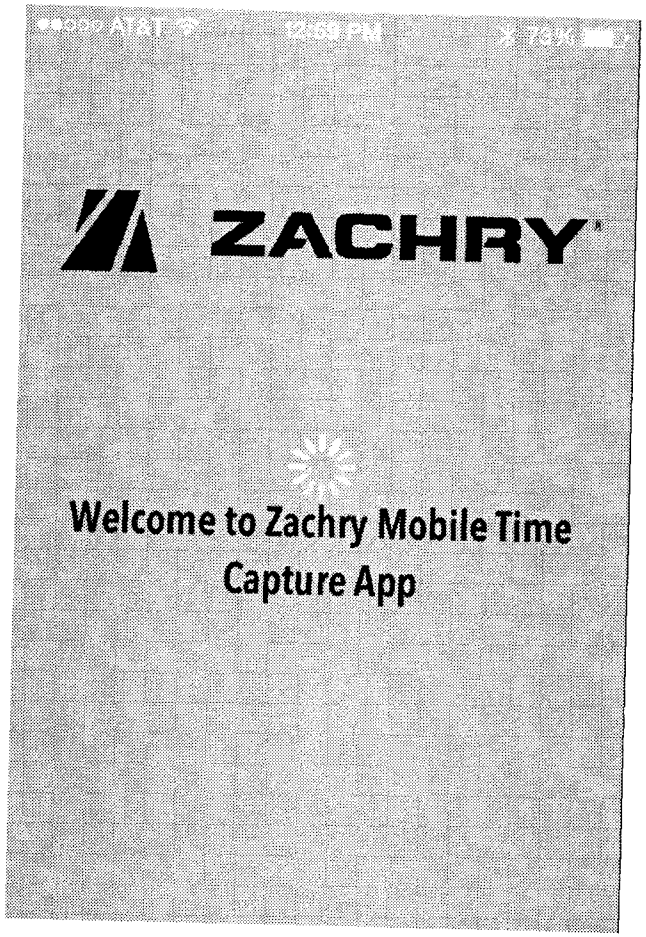


Fig. 28

CA 02916503 2015-12-30

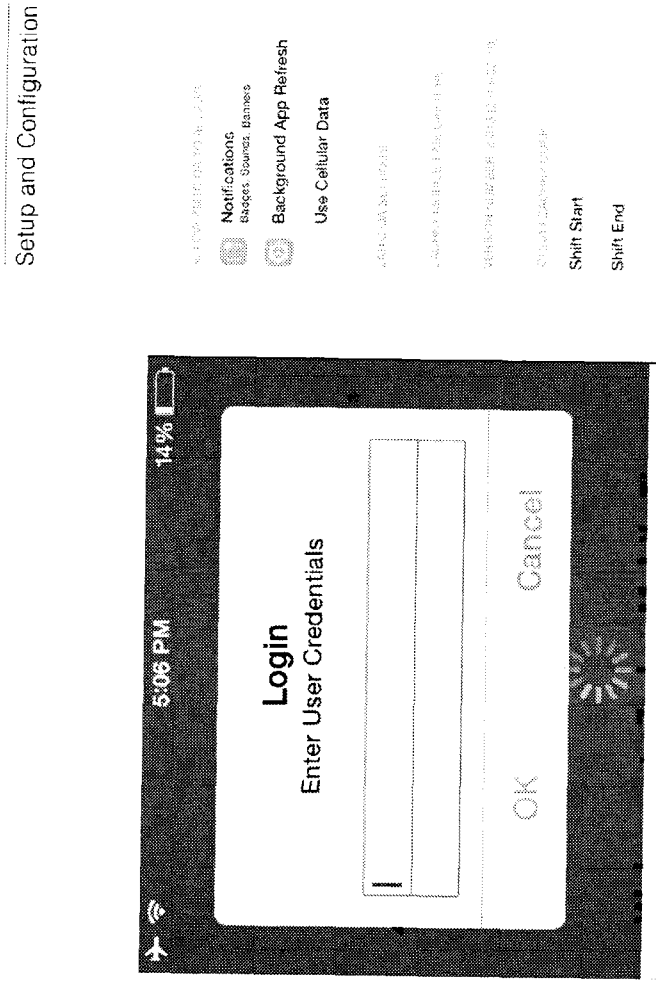

Setup and Configuration
5:07 PM
Shift Start
Notifications
Badges Sounds Banners
Background App Refresh
Use Cellular Data
6:30 am
7:00 am
7:30 am
8:00 am
8:30 am
9:00 am
9:30 am
10:00 am
10:30 am
11:00 am
Shift End
1:30 pm
2:00 pm
2:30 pm
3:00 pm
3:30 pm
4:00 pm
4:30 pm
5:00 pm
5:30 pm
6:00 pm
Shift Start
Shift End
Registration and Connection

Fig. 30

5:06 PM
14%
Login
Enter User Credentials
OK
Cancel
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
return

Fig. 29

Home Screen for a day

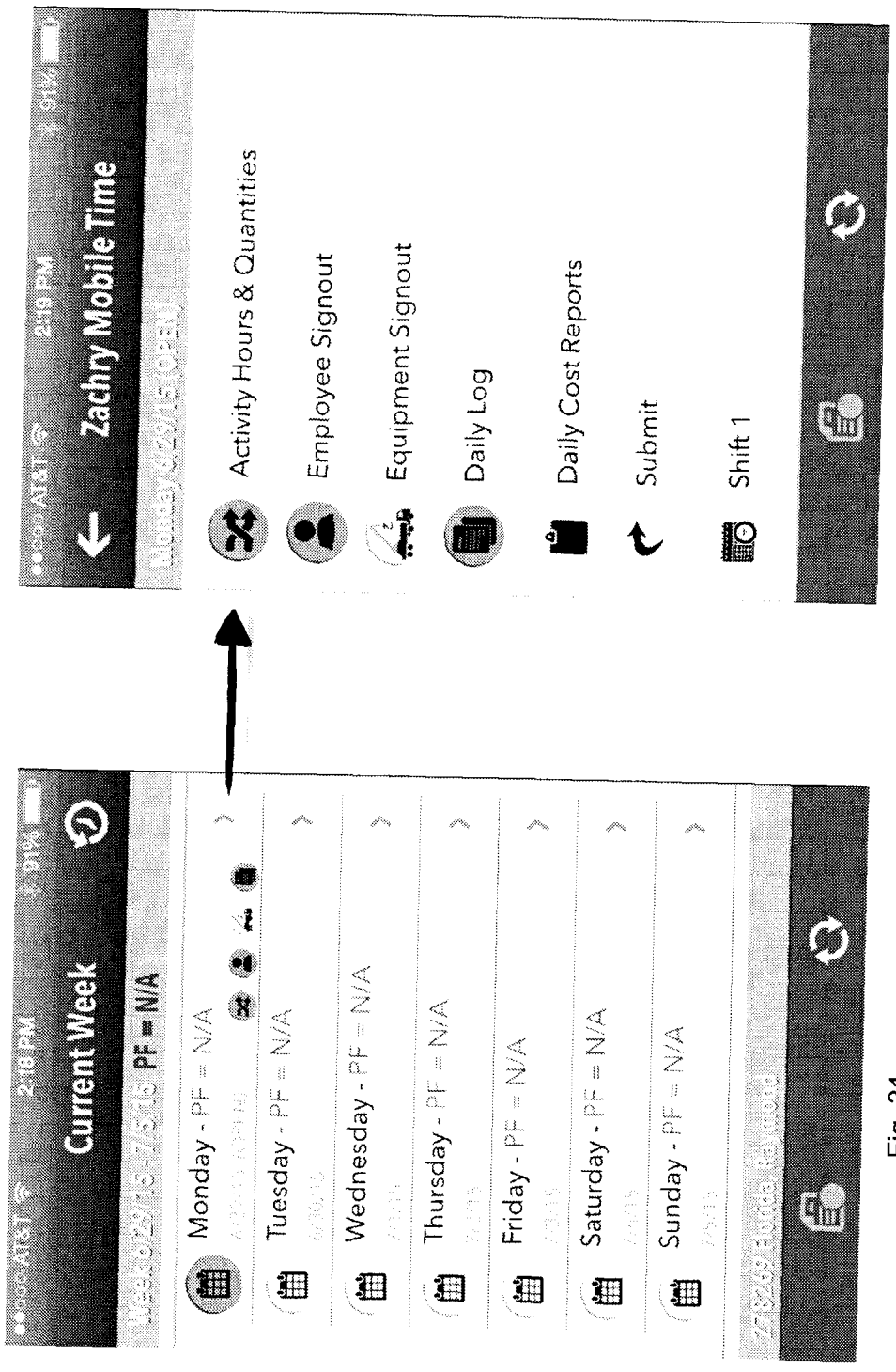


Fig. 31

Fig. 32

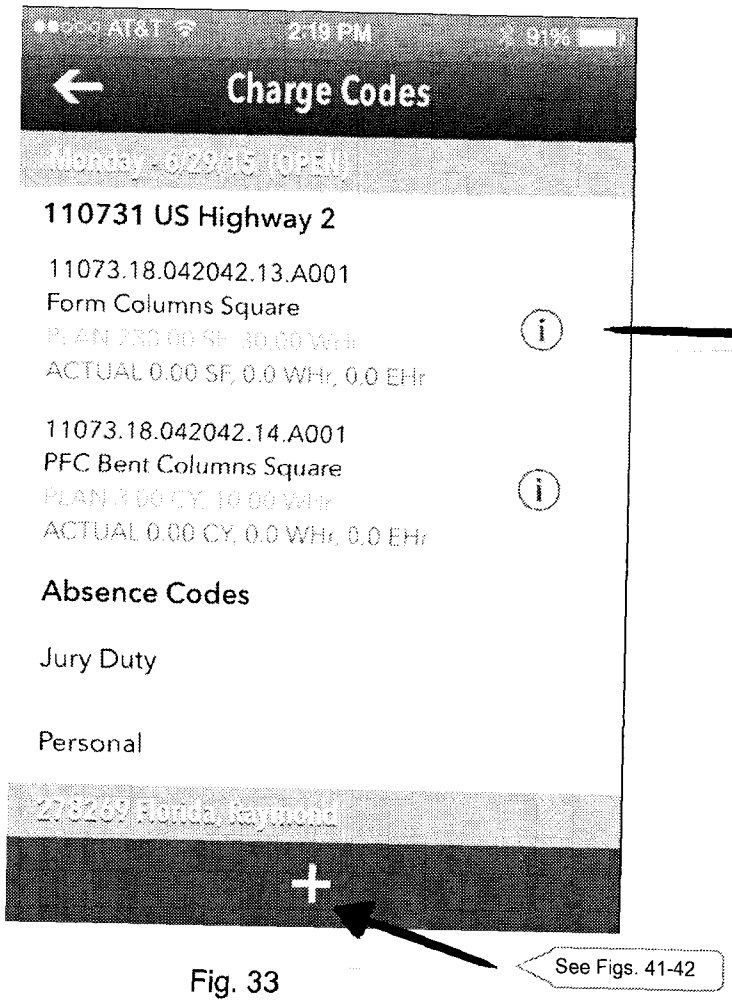


Fig. 33

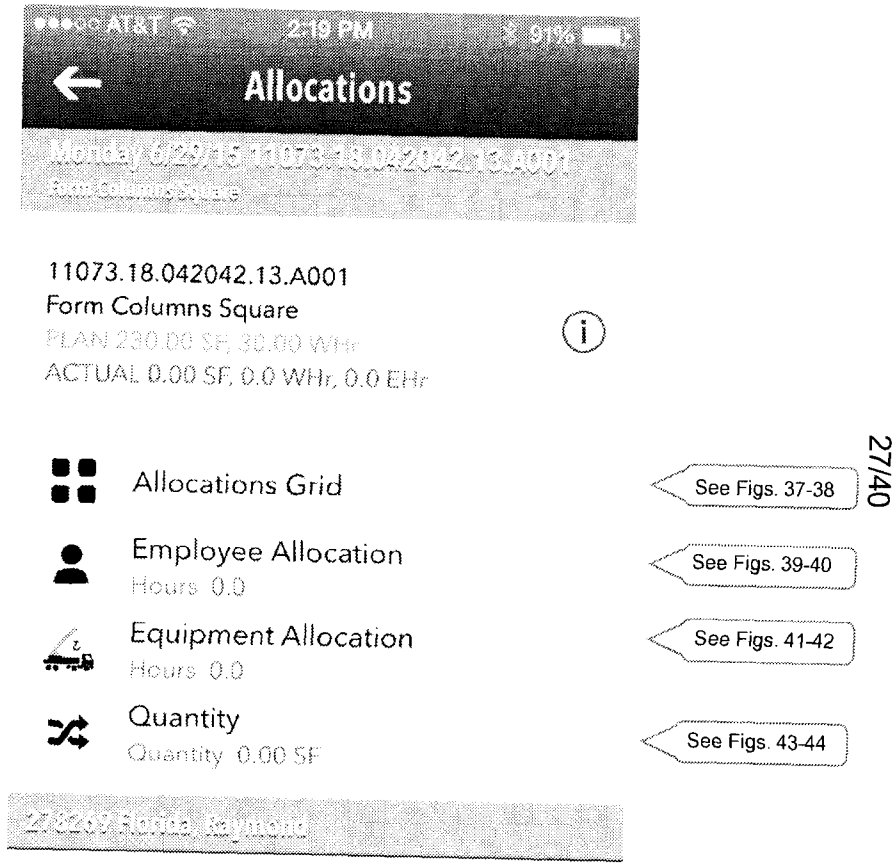


Fig. 34

CA 02916503 2015-12-30

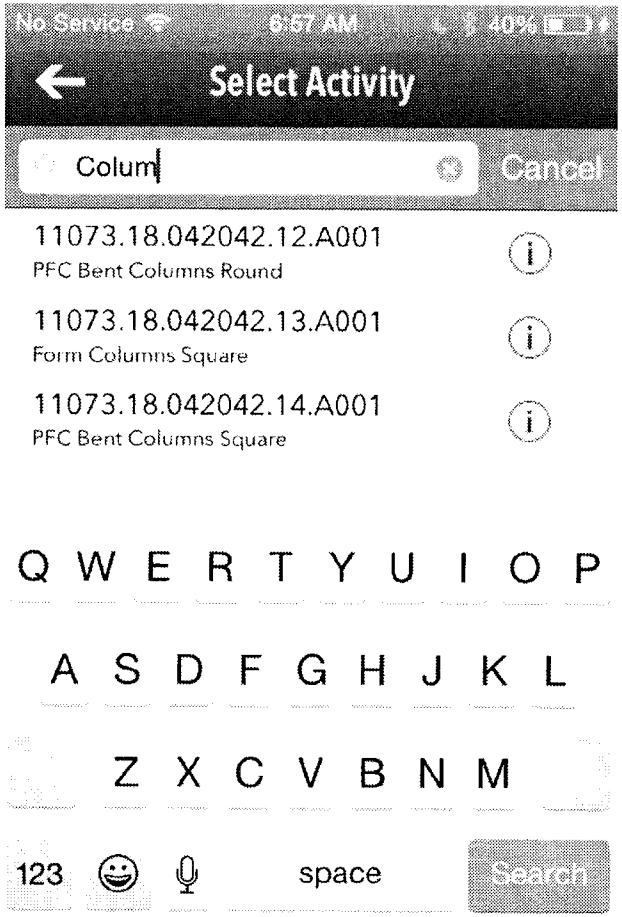


Fig. 35

1. Search any value contained in the Code or description
2. Click Activity
3. Select Element (Location)
4. Click

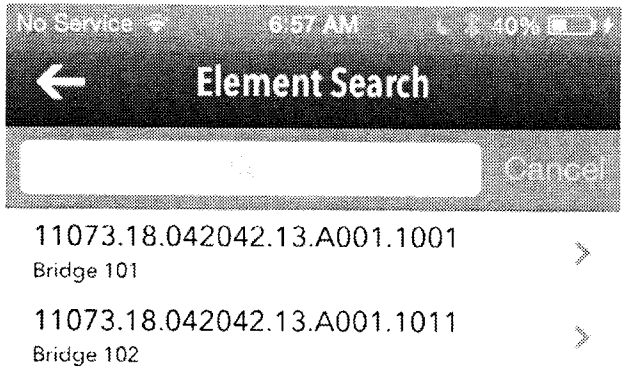


Fig. 36

CA 02916503 2015-12-30

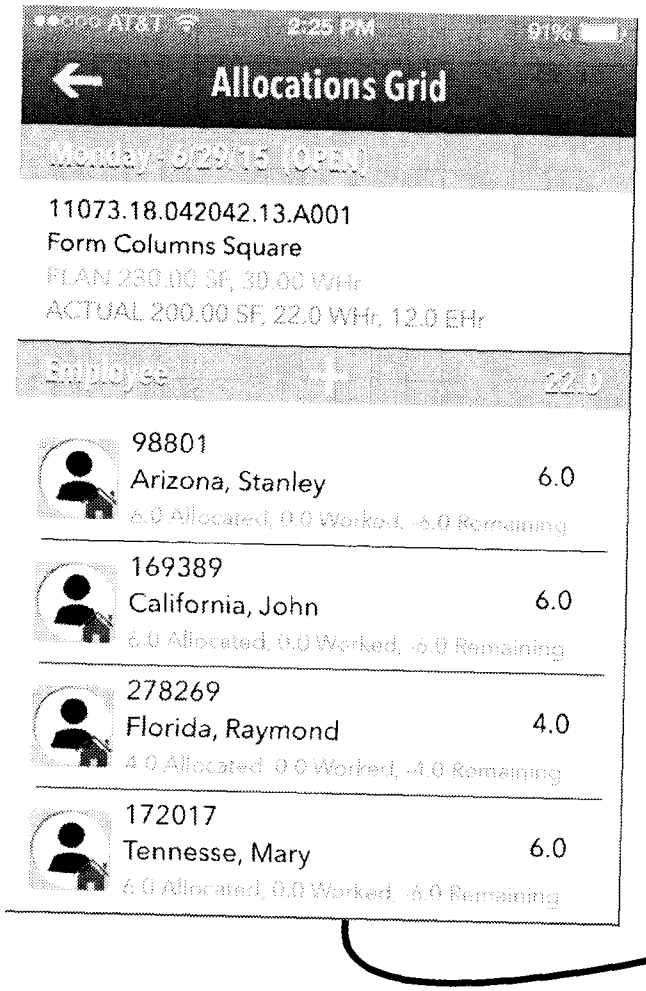


Fig. 37

Allocation Grid

1. Enter hours for each Employee and Equipment
2. Click

Fig. 38

CA 02916503 2015-12-30

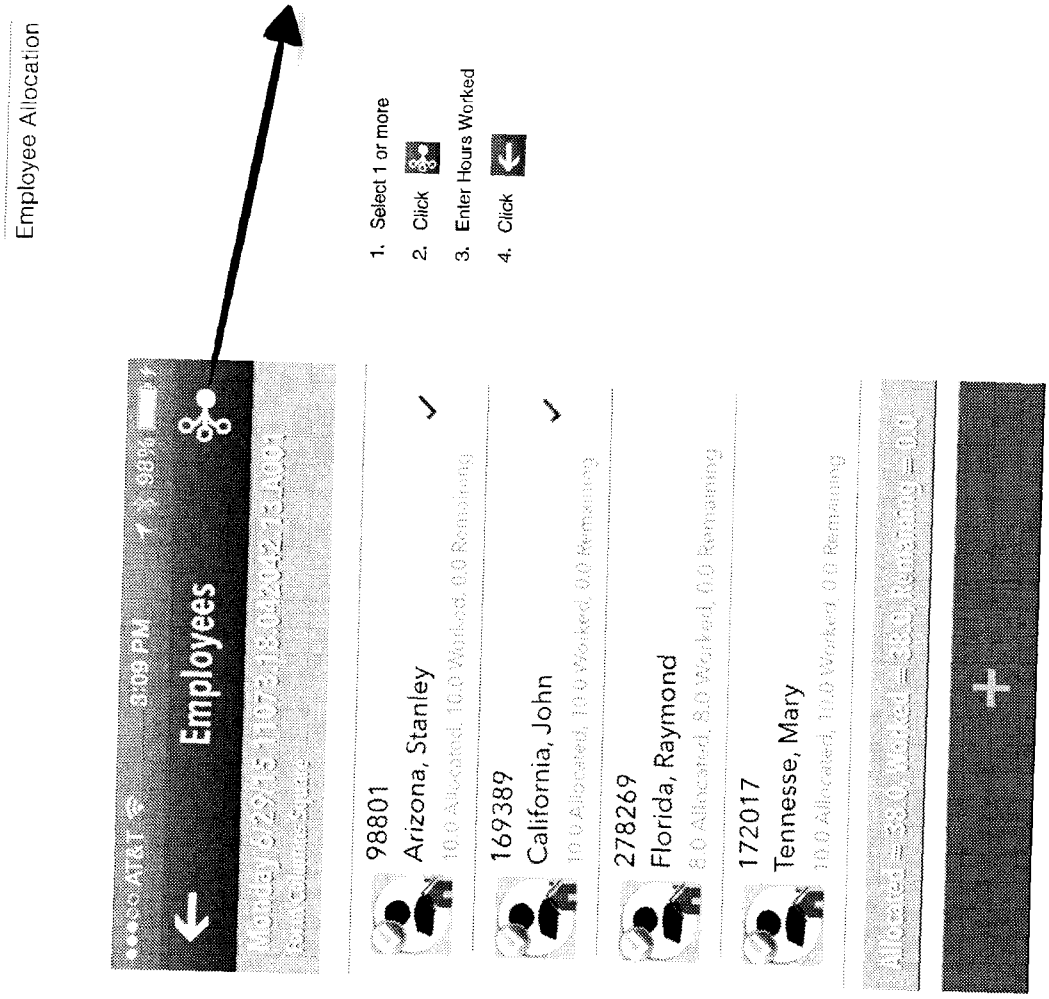
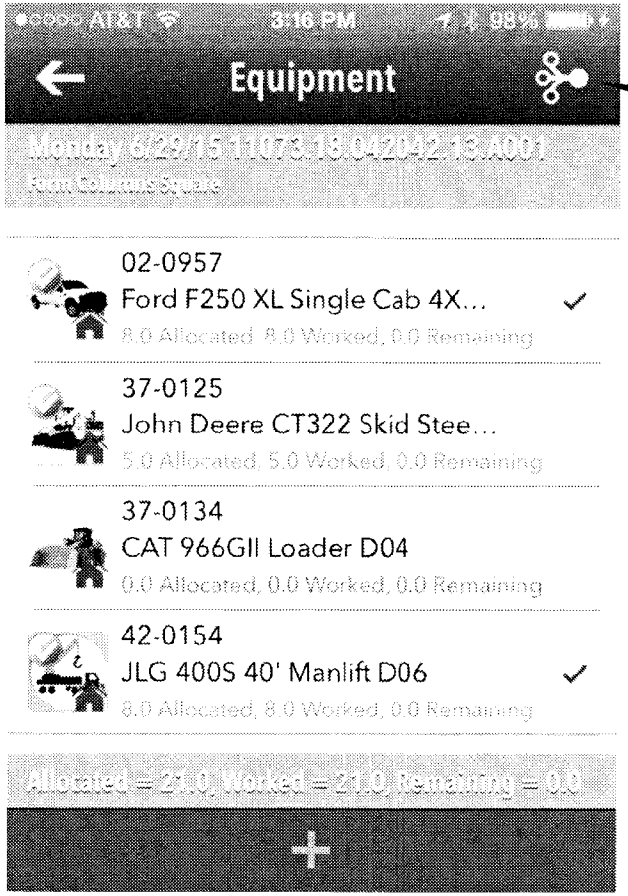

Employee Allocation
Employees
3:00 PM
98801
Arizona, Stanley
169389
California, John
278269
Florida, Raymond
172017
Tennesse, Mary
1. Select 1 or more
2. Click
3. Enter Hours Worked
4. Click
Employee Allocation
3:00 PM
Multiple Selected
Total Hours Worked Today
10.0
Remaining Hours to allocate
0.0
Hours Worked on this Activity
8.0

Fig. 39

Fig. 40

CA 02916503 2015-12-30

Equipment Allocation



1. Select 1 or more
2. Click
3. Enter Hours Worked
4. Click

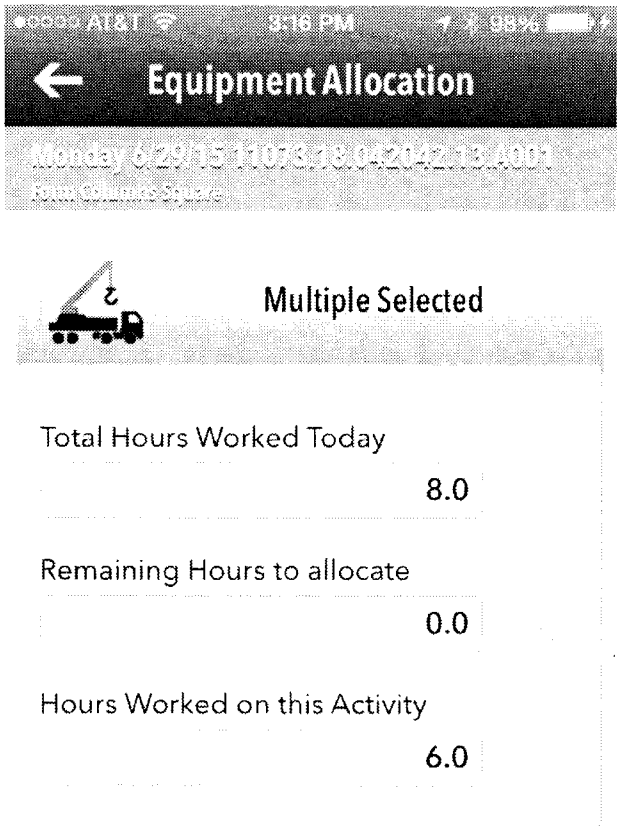
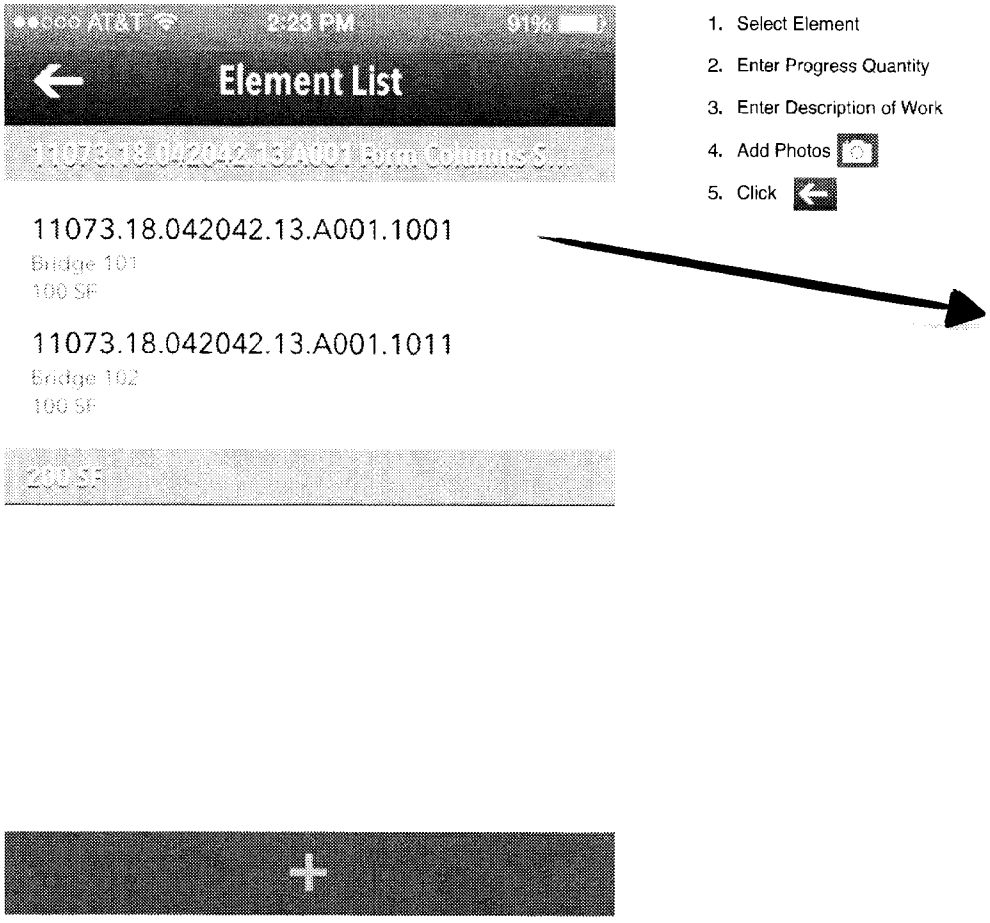


Fig. 41

Fig. 42

Quantity



1. Select Element
2. Enter Progress Quantity
3. Enter Description of Work
4. Add Photos
5. Click

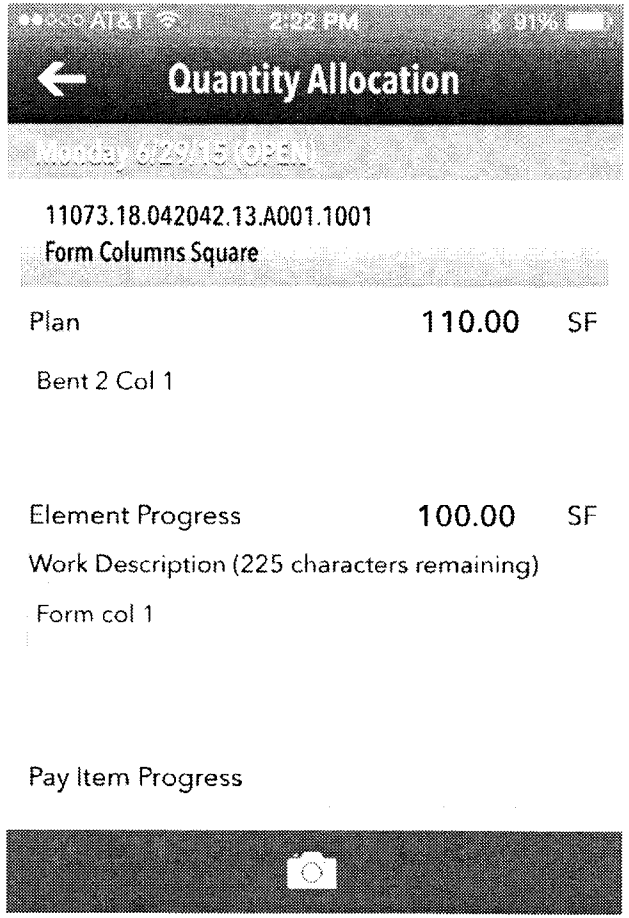
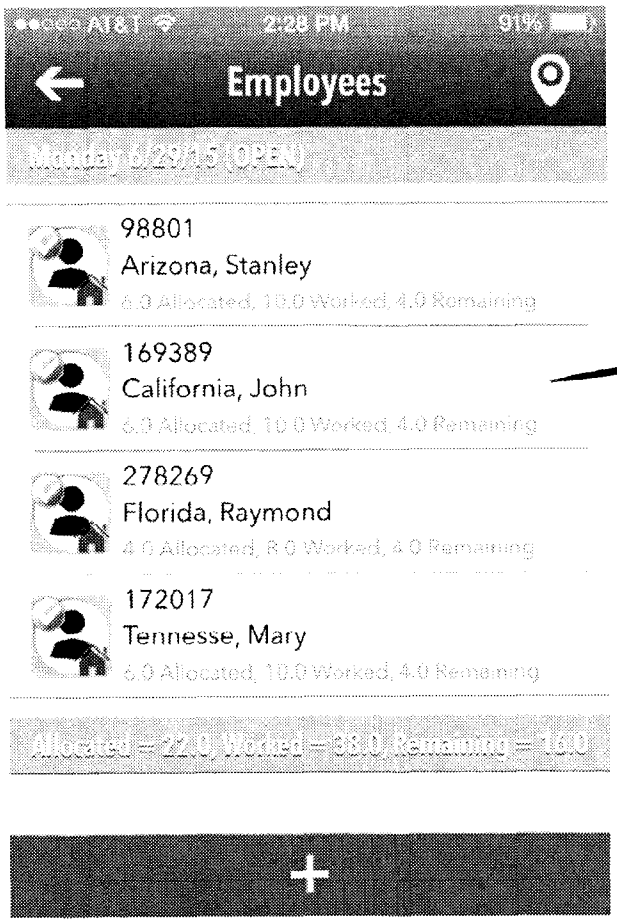


Fig. 43

Fig. 44

Employee Signout



1. Select Employee
2. Enter Hours Work Today
3. Click

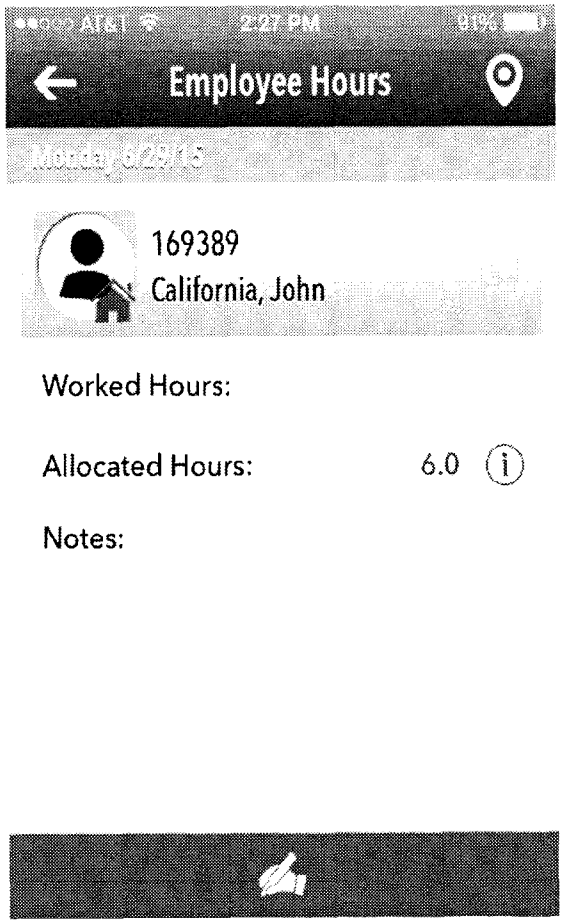


Fig. 45

Fig. 46

Employee Signout

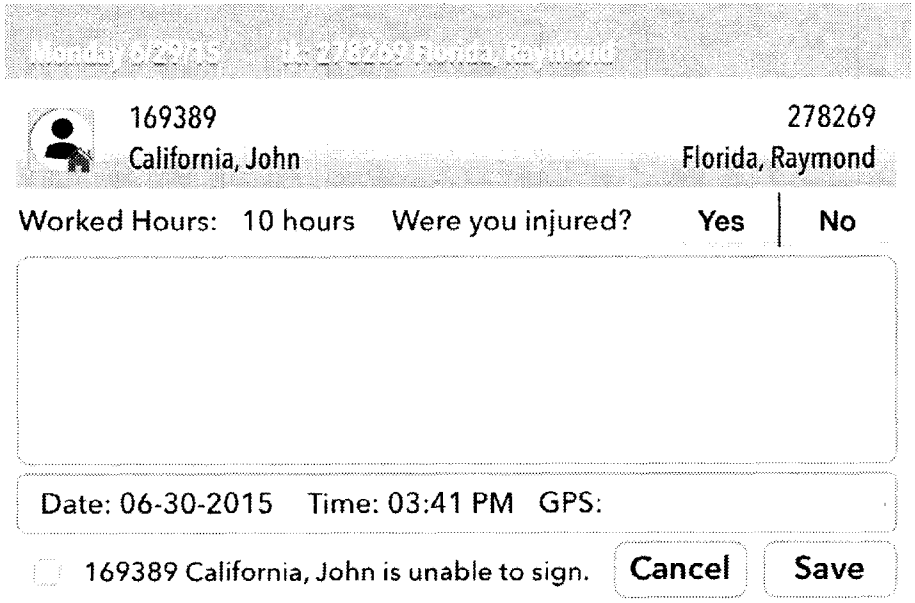
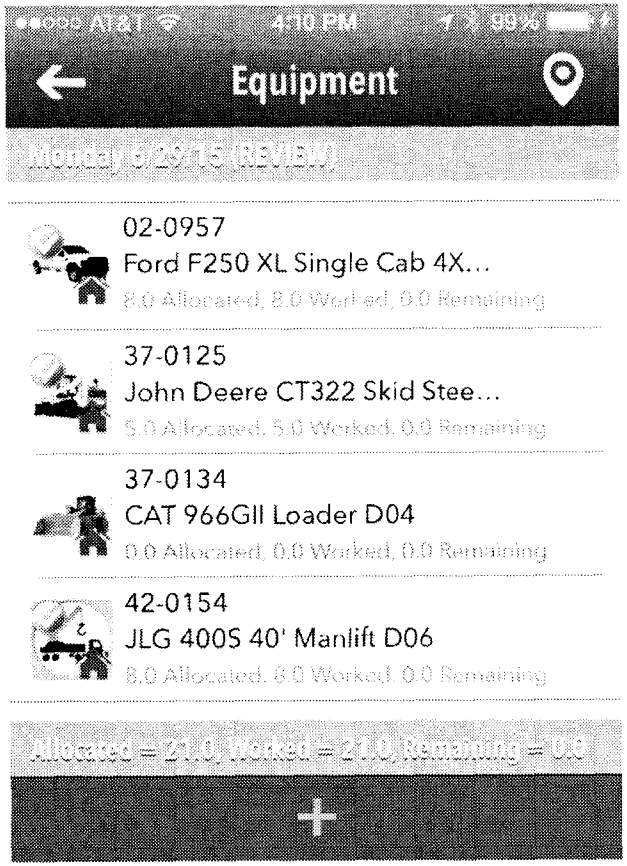


Fig. 47

1. Select Were you injured? Yes | No
2. Verify Worked Hours
3. Sign
4. Click Save



1. Select Equipment
2. Meter Source:
   - 2.1.Telematics
     - 2.1.1. Refresh to see Meter Hours
   - 2.2.Manual
     - 2.2.1. Enter Start and End Readings
   - 2.3. None
     - 2.3.1. No Meter required
3. Verify Worked Hours:
4. Click 

Fig. 48

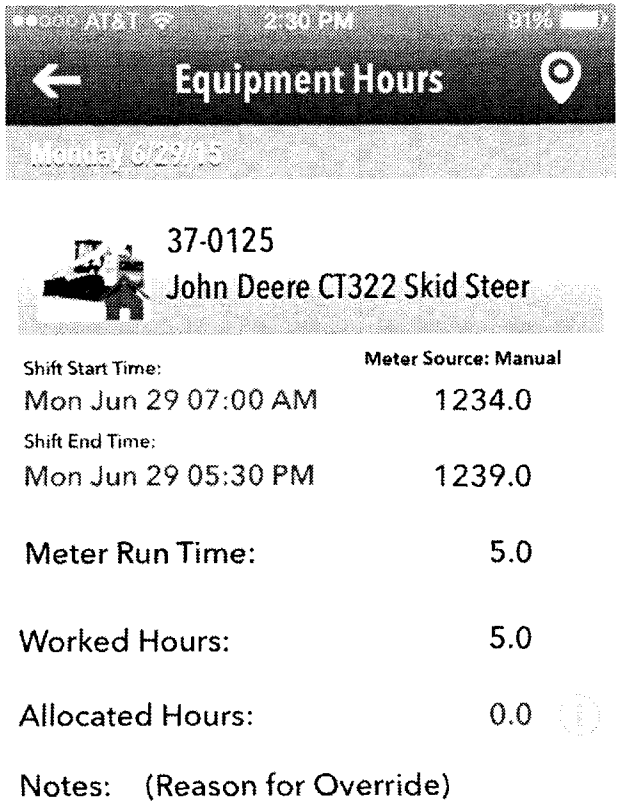
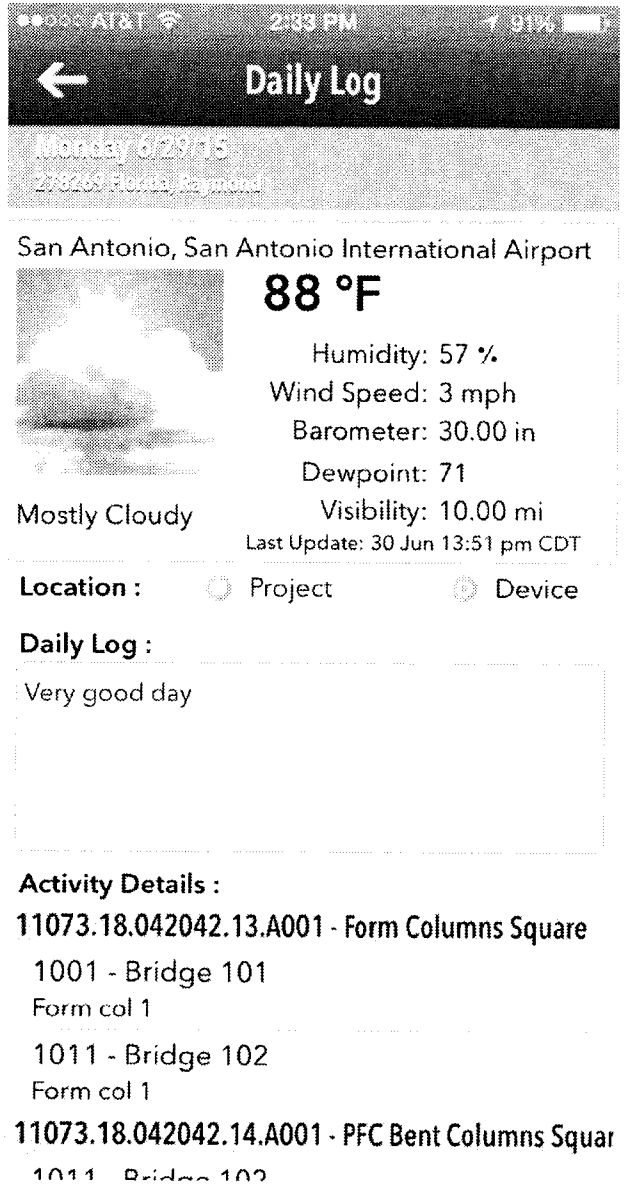


Fig. 49

CA 02916503 2015-12-30



Daily Log

1. Enter General comments about the day
2. Click

Fig. 50

CA 02916503 2015-12-30

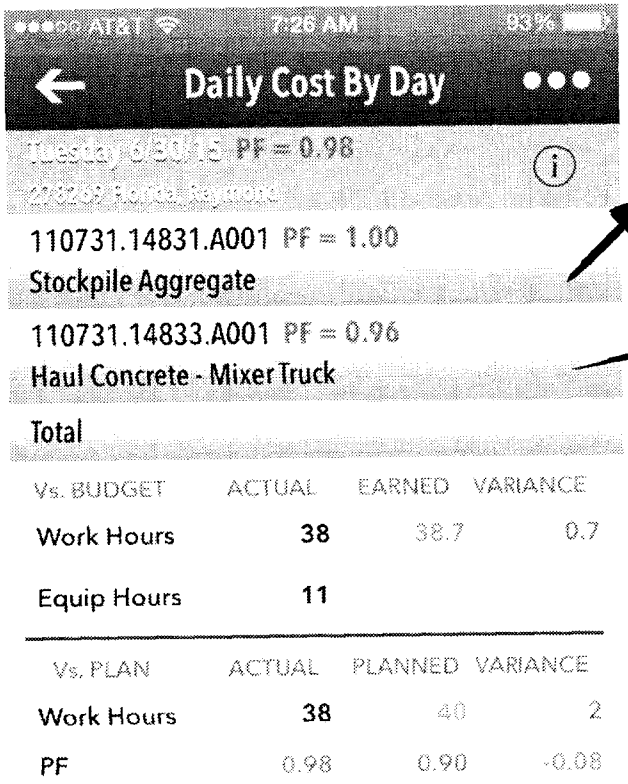


Fig. 51

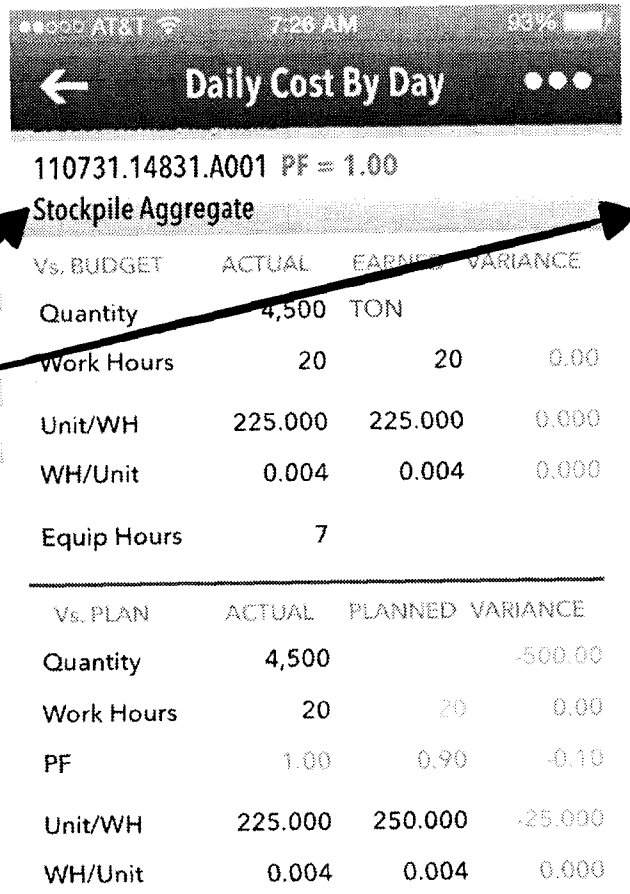


Fig. 52

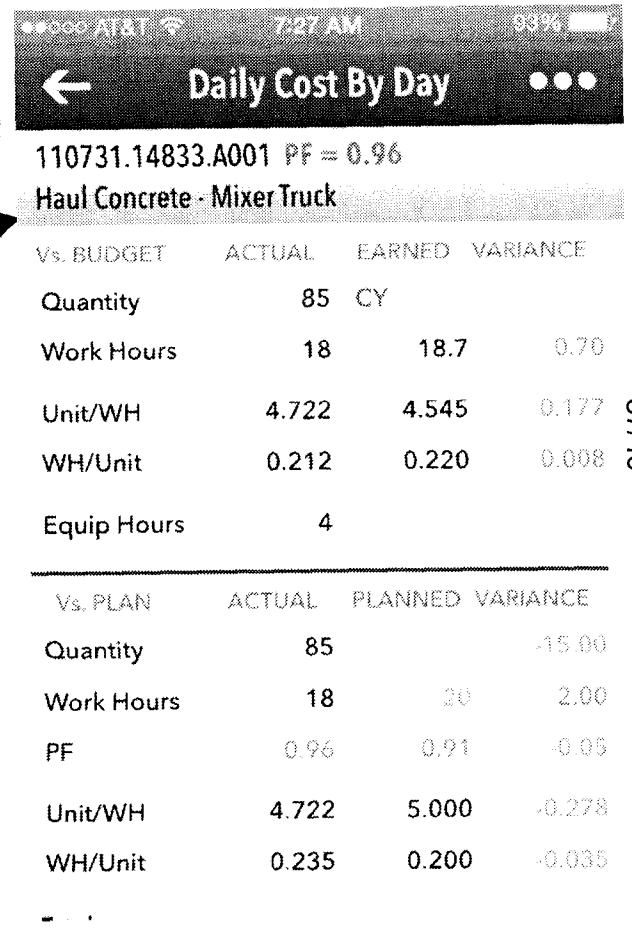


Fig. 53

CA 02916503 2015-12-30

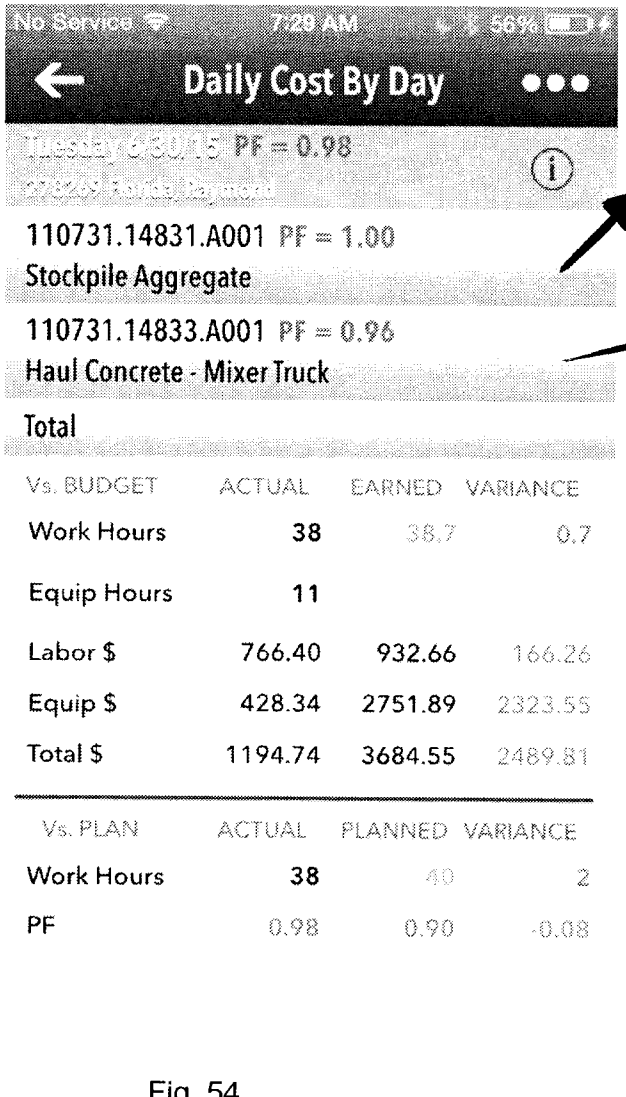


Fig. 54

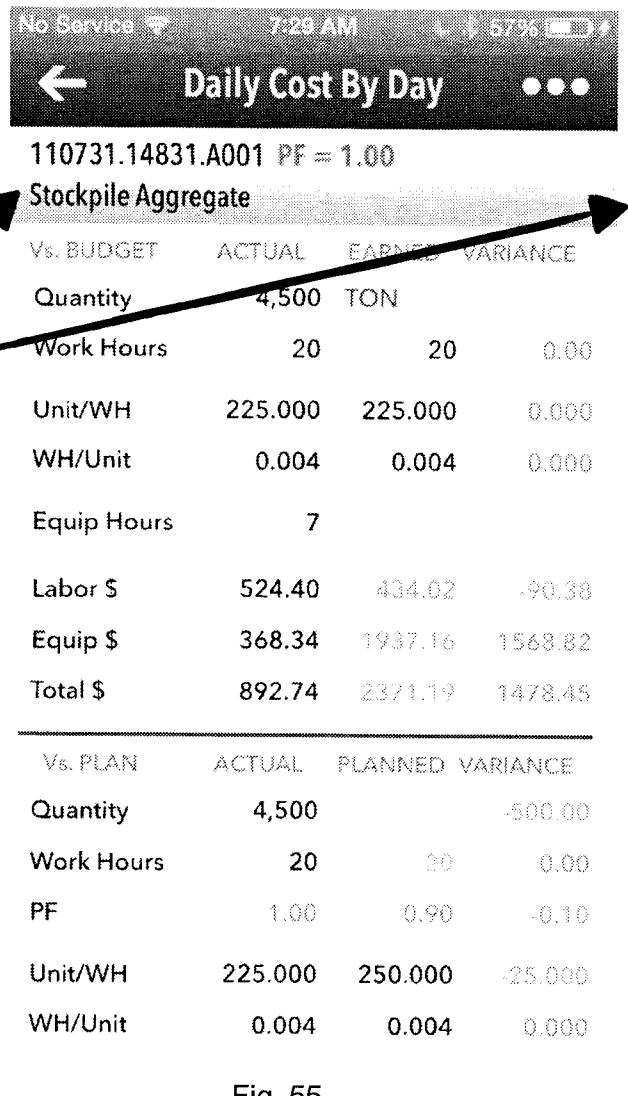


Fig. 55

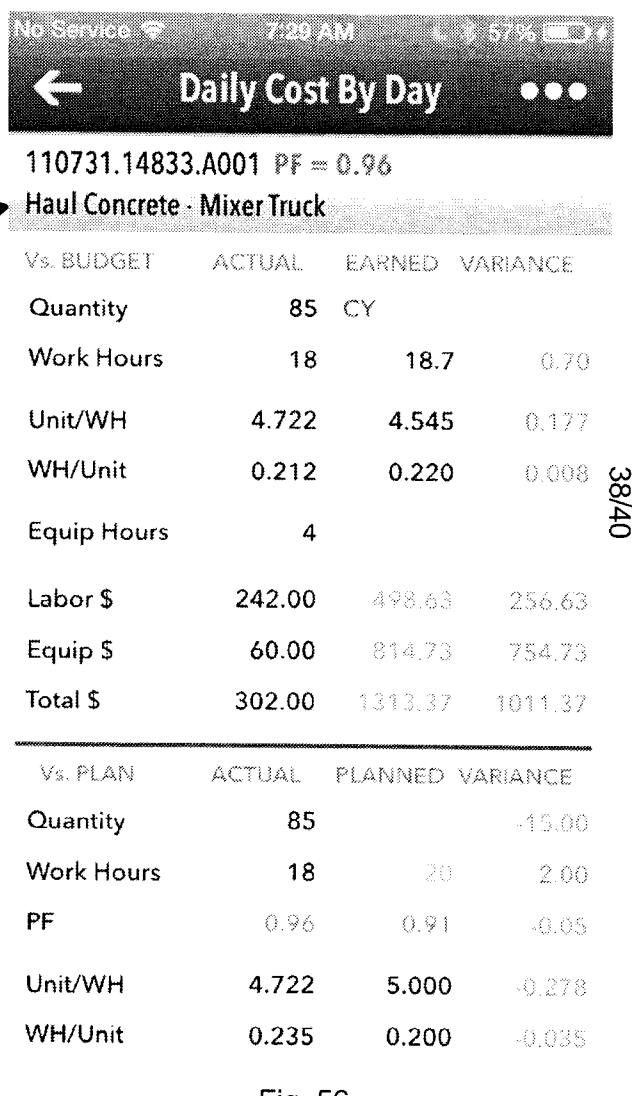


Fig. 56

CA 02916503 2015-12-30

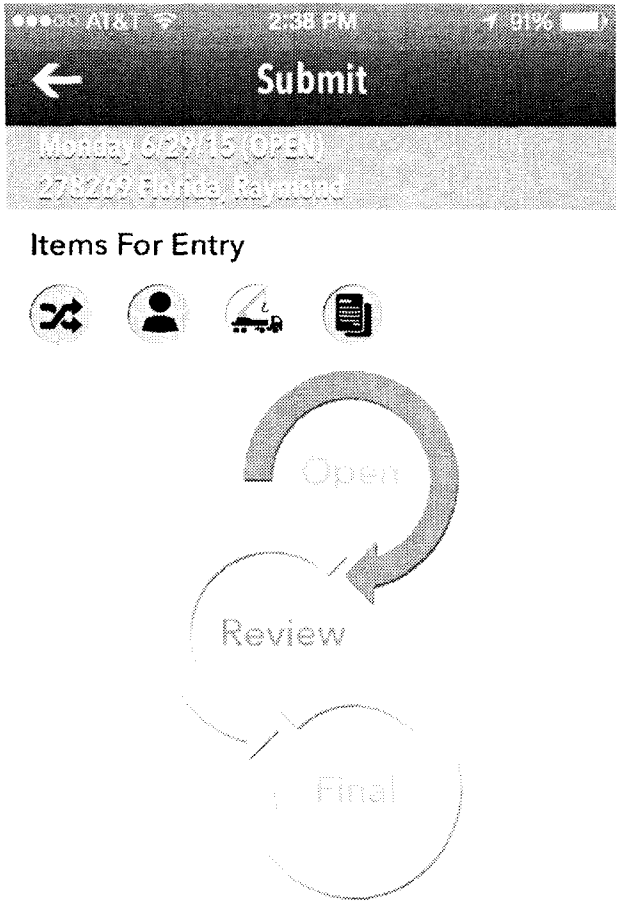


Fig. 57

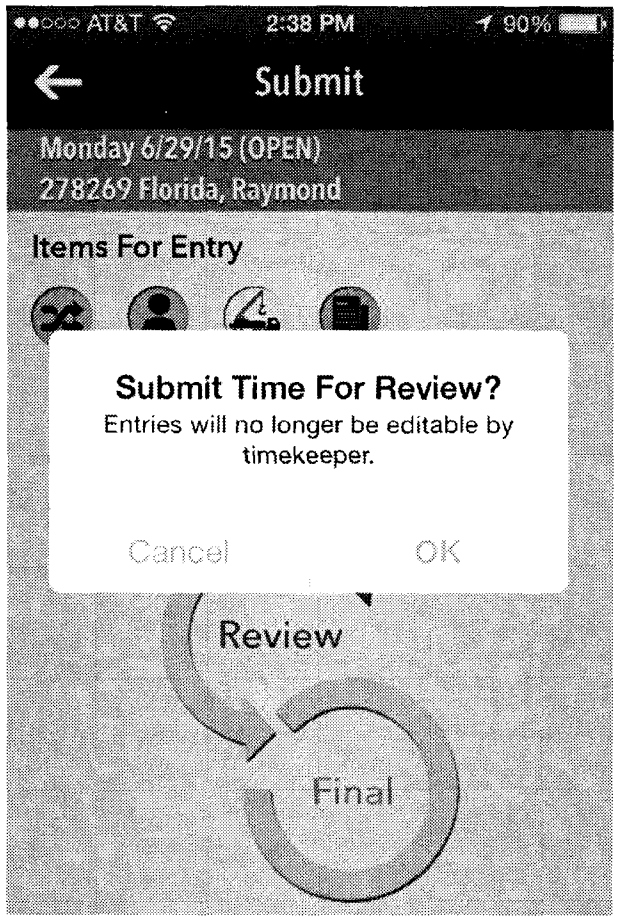


Fig. 58

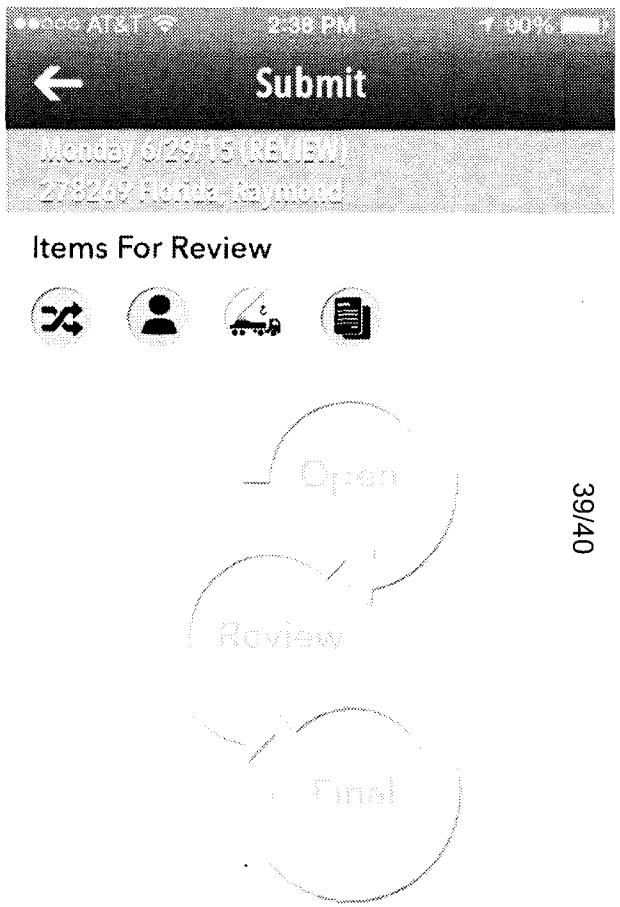


Fig. 59

CA 02916503 2015-12-30

Definitions

CHANGE

Time Keeper -

Can only see and edit their Time

Submit (Open to Review)

Field Engineer -

Can See and Edit his assigned Time Keepers

Submit (Open to Review)
Submit (Review to Final)
Submit (Review back to Open)

Project Engineer -

Can See and Edit All Time Keepers

Submit (Open to Review)
Submit (Review to Final)
Submit (Review back to Open)

Payroll Admin -

Can See and Edit All Time Keepers

Submit (Open to Review)
Submit (Review to Final)
Submit (Final back to Review)
Submit (Review back to Open)

DISPLAY

Discipline Superintendent -

Can Only See his assigned Time Keepers

Project Manager - (Project Manager / Superintendent)

Can View all Time Keepers

Fig. 60


Navigate Back 1 Screen


Refresh Sync Data


Get More Information


Add Charge Code, People or Equipment


Multi Select for data entry


Add Photo


Show Location on Map


Indicates Signed out Status


Indicates Home assigned People or Equipment


More Reports

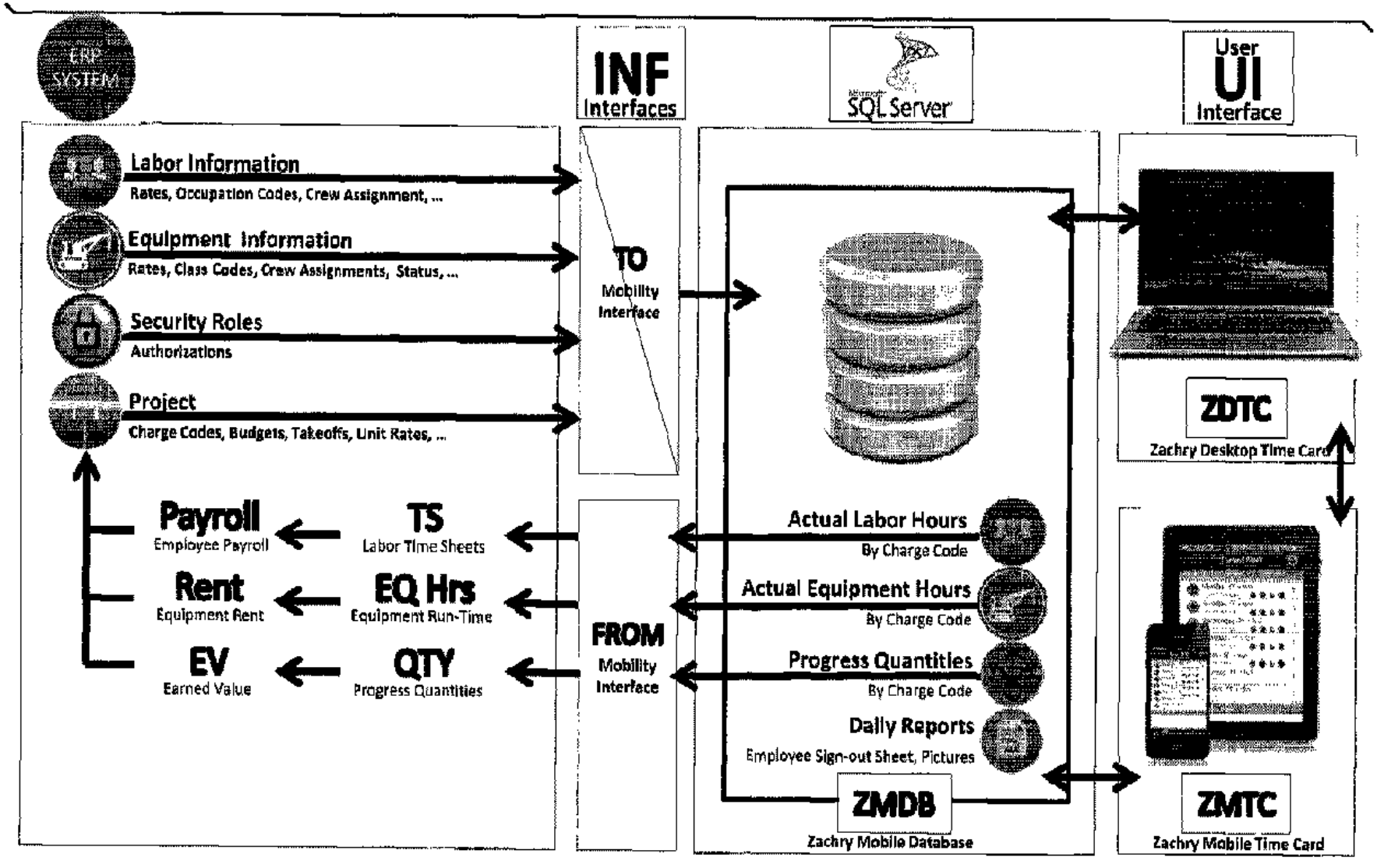

Submit Days Time/Progress


Change Shift assignment

Fig. 61

CA 02916503 2015-12-30

Functional Overview



ZACHRY