Cook County Department of Facilities Management

Civic Hackathon - 10 October 2015

Organization Description

* Organization's Purpose
  + Manage the government facilities within Cook County, including the district courts, county jail, juvenile jail, and more. They respond to day to day maintenance tasks, as well as execute larger long-term projects
* Theory of Change
  + If they can more efficiently allocate labor toward day to day tasks, they can free up labor for more project work, in addition to decreasing costs and getting more done.
* Actions They Take & Channels
  + All work is assigned through a work order system. Work orders are open, and closed when completed.
  + Review Work Orders Weekly
    - Automatic Reports
      * Aging work orders
      * Number of open reports by trade
* Prioritization
  + If it is life threatening, must complete in 8 hours
  + Emergencies
    - Priority 1, 2, 3
  + Age of work order
* Context They Work In
  + 43 M Budget
  + 500 Full Time Staff – mostly unionized
  + 183,000 Work Orders
  + 12 Million sq feet of usable space
* What They Keep Track Of
  + Individual data
    - how many tasks completed
  + Work Orders
    - job type
    - how long the order took to complete
    - how long the order was open for
    - who completed the order
    - total number of orders
    - complete (around 15-20% are completed but marked as open)
  + Task Data
    - type of task
    - who worked on it
    - how long it takes to complete

Problem Scoping

* Overarching Questions
  + How can they more efficiently allocate workers for day to day tasks in order to free up labor for more project-related work?
  + Do we have the right people in right place?
  + Can we reduce the workforce there?
  + Keeping the workforce the same, how can we get more done?
* Goals
  + Increase Productivity
  + Eliminate Overtime
  + Complete more work orders in less time
  + Allocate more staff toward project work
* Critical Questions
  + Chosen
    - How long should each work order take? (Descriptive)
      * Given: Type of task, location, number of workers, time taken
    - How many people should be assigned to each task? Each location? (Predictive/Descriptive) - is the task location specific? **<-** **is this true?**
  + Other
    - What work orders are taking longer than they should?
    - How can we more effectively report on our data?
    - What are metrics for determining the productivity of individual workers? (Detection)：medium？

Data

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Data Source | How is it stored? | How often is it collected? | What level of granularity? | Frequency of the data |
| Work Order | Access:  Worker, foreman?  Online proprietary database. Can be exported as pdf or csv. | Priority;  Location;  Description of the job;  Who to contact for more information;  Trade;  Date & Time opened;  Date & Time closed;  Time it took to complete;  Worker(s) assigned;  Foreman assigned;  Due date (default 1 week). | Work Order | As work orders are filed |
| Weekly Forecast |  |  |  |  |

What is publicly available that could be helpful in solving this problem?

What data could other government or private organizations have that will be helpful in solving this problem? What data do you wish you had?

* Average labor costs, direct-labor rates, industry standard for time or cost per task
* Rating the workers
* Similar data for other cities
* Data between union workers and non-union, government and non-gov projects

Solution Brainstorming

Tasks:

Come up with an efficiency metric - use median

location, task, number of people, trade, time, difficulty?

Questions:

What goes into the model?

F(x, y) = **amount of person hours to complete (assignment completion time/person)**, location, job type (Worker Metric)

G(x, y) = **amount of time from open to close (assigning assignment time)**, location, job type (Foreman Metric)

Assumptions:

* Work can be done in parallel.
* Work can be completed by one person.
* May change model after looking at actual data.

We’re not sure whether we want # people to be a parameter or not. Job time might be decreasing in number of people if people can do work in parallel.

How many benchmarks?

Several per job type (n!)

How many alerts per day?

Benchmark: 10 (Jobs per day <= 100)

What triggers alerts (what std dev?)?

iterative process - need to determine

Detecting work orders that are exceeding expected completion times

Detecting workers that are under (or over?) performing

Reporting Systems

Possible deliverables:

* Reference table of Performance Metrics (How many person hours does a task-location pair take on average)
  + Worker: person hours (assignment to close) per task given trade and location (median)
  + Foremen: hours (open to assignment) total hours per task given trade and location (median
* Detection: Alerts for outliers (10 biggest outliers each day)
  + Choose a std deviation that triggers ~10 alerts/day
* Nice to have: Reports on individual workers (and ultimately foremen) for performance reviews
* Experience exchange with counterparts who face the similar problems

Pitch & Communication

Restate the problem

Scope the problem

Propose Questions

Propose research activities

Who is your primary audience?

Who is your secondary audience?

What do you want them to do?

What type of impact do you want to have?

Tell a story.

Tool Box:

Stakeholder Interviews

User Interviews

Competitor Analysis

Judged on:

Problem - articulation

Data - creative

Solution

Overall - creative

Overall - communication

* Equally