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Rockingham County Call Volume Analysis

Rockingham County

Emergency Communications Governance Board

June 27, 2013

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Your Life Safety Mission Is Our Passion

MCP911.com



Staffing Study Process

- 3 Phases
 - Call Volume
 - Radio Traffic/Units/Workflow
 - Benefit/Training Time

- Summary Report

- Presentation

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Background

- Definitions
- Overview/Summary of the issues
- Applicable Standards
- Analysis
- Summary

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Definitions

- Busy Hour
- Average Service Time
- One-Stage / Two-Stage Calltaking
- Line Types
 - 911
 - 7-digit emergency
 - Administrative (“Admin”)



Busy Hour

- Busy Hour
 - Maximum total call volume in a 24-hour period
 - Most calculations are made based on busy hour
 - Number of incoming lines, staffing
 - Intentional busies/”choke points” are acceptable
 - Not practical to size/staff for 100% maximum call load



Average Service Time

- Total of several times:
 - Call setup (ringing)
 - Call handling time
 - Wrap-Up
 - Break

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Types of Call-Taking

- One-Stage (currently)
 - Telecommunicator that answers the call is also responsible for radio dispatching. Not necessarily dispatching *that* call, but has radio dispatch responsibilities
- Two-Stage
 - Calltaker and Dispatcher are separate functions.
 - Calltaker talks to the caller, dispatcher receives information via CAD and dispatches via radio

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Line Types

- 9-1-1
 - Includes wireline and wireless
- 7-digit emergency
 - Callers requesting law/fire/EMS response called in via 7-digit number (623-9755)
- Administrative (“Admin”)
 - Field users/responders with administrative requests



Shift Relief Factor

- **Myth: Staffing one position 24-hours per day requires 4 employees**
- Shift Relief Factor
 - Indicates the number of full-time employees (FTE) needed to staff (1) position.
 - Includes all types of benefit/training time
 - Gives the most accurate picture of required staffing



Example – Staffing Worksheet

Types of Leave/Work Days		2009
A.	Agency Work Days	365.00
B.	Standard Shift Length (Hours)	12.00
C.	Regular Days Off per 2-week rotation	7.00
		Prior Year
D.	Benefit Hours - Vacation	114.60
E.	Benefit Hours - Sick Leave	81.00
F.	Other Time Off (FMLA, military leave, funeral leave, unexcused absence)	135.57
G.	Benefit Hours - Personal	24.00
H.	County Holidays	0.00
I.	Training Hours	32.00
J.	Total Hours Off (D+E+F+G+H+I+J)	387.17
K.	Actual Work Hours (excluding breaks/meals)	1802.95
L.	Break/Meal Allowance Hours	150.19
M.	Actual Work Hours after Break/Meal Allowance	1652.76
Shift Relief Factor - Before Consideration of Turnover		
N.1	Number of employees per 24-hour position	5.30
N.2	Number of employees per 12-hour position	2.65
Shift Relief Factor - After Consideration of Turnover		
O.1	Prior year turnover rate	13.1%
O.2	Additional employees needed to cover one 12-hour shift due to vacancies	0.69
O.3	Number of employees per 24-hour position	5.99
O.4	Number of employees per 12-hour position	3.00
Positions Requiring Staffing		
24-hours per day		
	Police	11.00
	Fire/EMS	4.00
	Calltakers	4.00
	Supervisors	3.00
12-hours per day (additional daytime call volume)		
	Calltakers	3.00
Required Staffing		
	Police	66.00
	Fire/EMS	24.00
	Calltakers	33.00
	Supervisors	12.00
	Total Required Communications Center Staff (FTE)	135.00

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Standards

- Design and Costing of 911 Systems – A Technical Manual
 - US DOJ, Sept 1980
- National Fire Protection Agency (NFPA) 1221
 - NFPA 1221: Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems
- APCO/ANSI
 - Public Safety Answering Point (PSAP) Service Capability Criteria Rating Scale

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Standards

- Emergency Calls (9-1-1 and 7-digit)
 - 90% answered in 10 seconds
 - 95% answered in 20 seconds
- Administrative Calls
 - No industry standard

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Admin versus Emergency

- ~13,000 7-digit calls to the 3 PSAPs per month
 - Need to separate “dispatchable” calls from administrative calls
 - Sampled calls from each PSAP
 - Margin of error sampling (example)
 - Voters
 - Sample 400 – margin of error is +- 5%
 - Sample 1600 – margin of error is +- 2.5%
 - Sample 10,000 – margin of error is +- 1%



Admin versus Emergency

- From sampling:

	Admin	Emergency
Rockingham	55%	45%
Eden	46%	54%
Reidsville	51%	49%



Call Summary Worksheet

- Work in progress
 - Call totals and admin vs emergency – done
 - Busy hour calculations – done
 - Average call time/time of day – pending

	911			Admin			Transfers			Total Monthly Call Volume (911)	Total Monthly Call Volume (911, Admin)			Total Monthly Call Volume (Admin - Est.)			Total Monthly Call Volume (10-digit - Est.)			Busy Hour Volume 911			Busy Hour Volume 10-digit			Busy Hour Volume Admin			Days/ month	
	RC911	RPD	EPD	RC911	RPD	EPD	RC911	RPD	EPD	All Sites	RC911	RPD	EPD	RC911	RPD	EPD	RC911	RPD	EPD	RC911	RPD	EPD	RC911	RPD	EPD	RC911	RPD	EPD		RC911
Jan-11	2606	1131	950	5874	2508	3498	0	259	279	4149	8480	3639	4448	3231	1279	1609	2643	1113	1889	4.6	1.6	1.2	4.7	2	3.4	5.7	2.3	2.9	31	
Feb-11	2893	1003	843	6488	2272	3016	0	256	241	4242	9381	3275	3859	3568	1159	1387	2920	1299	1629	5.1	1.4	1.1	5.1	1.8	1.5	11.4	4	5.3	28	
Mar-11	2872	1265	993	7310	2650	3363	0	281	293	4556	10182	3915	4356	4021	1352	1547	3290	1345	1816	5.1	1.8	1.3	5.1	2.3	1.8	12.8	4.7	5.9	31	

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Call Volume Summary - Example

911			Admin			Transfers			Total Monthly Call Volume (911)	Total Monthly Call Volume (911, Admin)	Total Monthly Call Volume (Admin - Est.)	Total Monthly Call Volume (10-digit - Est.)						
RC911	RPD	EPD	RC911	RPD	EPD	RC911	RPD	EPD	All Sites	RC911	RPD	EPD	RC911	RPD	EPD	RC911	RPD	EPD
2606	1131	950	5874	2508	3498	0	259	279	4149	8480	3639	4448	3231	1279	1609	2643	1113	1889
2893	1003	843	6488	2272	3016	0	256	241	4242	9381	3275	3859	3568	1159	1387	2920	1299	1629
2872	1265	993	7310	2650	3363	0	281	293	4556	10182	3915	4356	4021	1352	1547	3290	1345	1816
3264	1370	937	7326	2745	3627	0	326	247	4998	10590	4115	4564	4029	1400	1668	3297	1375	1959
3225	1354	999	7475	2807	3792	0	290	261	5027	10700	4161	4791	4111	1432	1744	3364	1457	2048

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Busy Hour Calculations

- When available, actual data is extracted
- When impractical or unavailable, 30% over average is used

Busy Hour Volume 911			Busy Hour Volume 10-digit			Busy Hour Volume Admin		
RC911	RPD	EPD	RC911	RPD	EPD	RC911	RPD	EPD
4.6	1.6	1.2	4.7	2	3.4	5.7	2.3	2.9
5.1	1.4	1.1	5.1	1.8	1.5	11.4	4	5.3
5.1	1.8	1.3	5.1	2.3	1.8	12.8	4.7	5.9
5.8	1.9	1.3	5.8	2.4	1.7	12.9	4.8	6.4
5.7	1.9	1.3	5.7	2.4	1.8	13.1	5	6.7



Call Volume Summary

- Assumes **busy hour** and a consolidated center

Call Type	Calls per hour (busy hour)
9-1-1	11
7-digit emergency	10
Administrative	13



Calculations

- Using “Erlang-C” calculations
 - Very well documented and proven
 - Standard parameters:
 - Calls per hour
 - Average Service (Call) Time
 - Service Level (XX% waits XX seconds)
 - Result: Number of calltakers
 - Calculations are not linear, and not additive

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Average Service Time

- A lot of variations
 - Law vs. EMS vs. Fire
 - 9-1-1 vs 7-digit
 - Tenure/experience

- Initially we will use 120 seconds, on average



Practical Summary

- There is no standard for 7-digit emergency nor administrative lines
- For practical purposes, administrative lines will be excluded. These are answered on a “best effort” basis, and usually by radio dispatchers
- 7-digit emergency calls will be treated like 9-1-1



Summary Calculations

	Calls per Hour	Average Wait Time (secs)	Calltakers Required
RC911 Only			
9-1-1 & 7-digit	12	5	2
Consolidated			
9-1-1	11	4	2
7-digit	10	3.5	2
9-1-1 & 7-digit	21	2	3

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Practical Calculation

- 9-1-1 and 7-digit emergency
 - 21 calls per hour (busy hour)
 - Average Service Time = 120 seconds
 - Service level – 90% answered in 10 seconds
- Result:
 - 3 calltakers
 - Average wait (ring) time of 2 seconds



Open Items

- Additional data needed
 - Calls by hour of day/day of week
 - Will help with full-time/part-time calculations
 - Average Service Time (RC911)
 - Current estimate is likely **low** – assumes two-stage when reality is one-stage
 - Busy Hour
 - May be able to verify busy hour calculations
 - eCATS access for each PSAP
 - Actual Benefit Time from Rockingham County payroll data