

OPTIMIZATION OF TRAFFIC CONTROL MANAGEMENT IN ELECTRICAL UTILITY MAINTENANCE WORK ZONES

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ABSTRACT

This study evaluated traffic control management practices in electrical utility maintenance work zones, focusing on operational efficiency, worker safety, and cost considerations. The analysis compared current practices, where electrical crews perform both technical and traffic control duties, with a proposed approach using dedicated traffic control personnel. Findings indicated that separating traffic control responsibilities may reduce workflow interruptions, improve work zone organization, and reduce worker exposure to traffic-related hazards. Although additional operational costs were identified, the proposed strategy supports improved risk management and safer maintenance operations.

KEY TERMS



INTRODUCTION

- Electrical utility maintenance occurs near active traffic.
- Utility crews perform pole replacement, line repairs, transformer installation, and other critical tasks.
- Many work zones require traffic management.
- Crews often perform both technical work and traffic control duties.
- Dual responsibilities may increase:
 - Worker distraction
 - Workflow interruptions
 - Traffic hazard exposure



OBJECTIVE

- Evaluate the benefits of assigning dedicated traffic control personnel to improve:



LITERATURE REVIEW

- High frequency of struck-by incidents in work zones. [1]
- Advanced traffic management systems improve efficiency. [2]
- Driver distraction increases risk of vehicle intrusion. [3]
- Poor compliance with traffic control devices creates hazards. [4]
- TTCP implementation and standardization reduce risks. [5]
- Quantitative models support selection of optimal traffic control strategies. [5]

MAIN FINDING:
Separation of traffic control and technical work improves safety, operational coordination, and risk management.

WORK ZONE SCENARIOS

1. ELECTRICAL CREW CONTROLS TRAFFIC



- ⊖ Electrical crew performs technical work AND traffic control duties.
- ⊖ Divided attention increases risk.
- ⊖ More interruptions and lower efficiency.
- ⊖ Higher worker exposure to traffic.

2. DEDICATED TRAFFIC CONTROL PERSONNEL



- ⊕ Electrical crew focuses on technical tasks.
- ⊕ Dedicated flaggers manage traffic safely.
- ⊕ Improved workflow and task continuity.
- ⊕ Reduced exposure to traffic hazards.

COMPARISON OF WORK ZONE MANAGEMENT APPROACHES

ASPECT	ELECTRICAL CREW CONTROLS TRAFFIC	DEDICATED TRAFFIC CONTROL PERSONNEL
SAFETY	<ul style="list-style-type: none"> • Higher exposure to moving traffic • Increased risk of struck-by incidents 	<ul style="list-style-type: none"> • Lower exposure to traffic • Improved safety for workers & public
EFFICIENCY	<ul style="list-style-type: none"> • Workflow interruptions • Divided attention reduces productivity • Longer task completion time 	<ul style="list-style-type: none"> • Continuous workflow • Dedicated focus on technical work • Faster completion of tasks
TASK ALLOCATION	<ul style="list-style-type: none"> • Crew performs both technical and traffic control duties 	<ul style="list-style-type: none"> • Clear separation of responsibilities • Specialized roles improve performance
COST	<ul style="list-style-type: none"> • Lower direct cost 	<ul style="list-style-type: none"> • Higher direct cost • Potential savings from reduced delays, incidents, and liabilities
OVERALL IMPACT	<ul style="list-style-type: none"> • Higher risk • Lower efficiency • Potential for delays and incidents 	<ul style="list-style-type: none"> • Improved safety • Higher efficiency • Better work zone organization

COMPARATIVE PERFORMANCE SUMMARY



METHODOLOGY



COST ANALYSIS (ESTIMATED DAILY COSTS)

COST COMPONENT	WITHOUT DEDICATED TRAFFIC CONTROL	WITH DEDICATED TRAFFIC CONTROL
Foreman	\$424	\$424
Journeyman Lineman	\$368	\$328
Crane Operator	\$328	\$328
Groundmen (2)	\$464	\$464
Certified Flaggers	Included	\$256
Traffic Control Supervisor	Not Included	\$176
Traffic Signs / MOT Devices	Minimal	Included
Arrow Board Trailer	Rented by contractor	Included
Traffic Setup / Lane Control	Performed by crew	Included
Transportation / Mobilization	Included	Included
TOTAL ESTIMATED DAILY COST	\$1,584 / DAY	\$2,016 / DAY

BENEFITS OF DEDICATED TRAFFIC CONTROL



CONCLUSION

- Dual responsibilities increase workflow interruptions and worker risk.
- Dedicated traffic control personnel improve safety, efficiency, and work zone organization.
- Additional costs may be justified by reduced delays, incidents, and potential liabilities.
- Separating traffic control from technical work is a practical risk management strategy for utility maintenance operations.

REFERENCES

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