NIGHTTIME WORK ZONES

• The last half of the 20th century and the beginning of the 21st century had seen a significant increase in urban congestion.

• **Causes** of Urban Congestion:
  
  • High volume of traffic by *recurring congestion* (Holguin-Veras 2001)
  
  • Increased volume of traffic by *non-recurring / incident congestion* (accidents) (Holguin-Veras 2001)
  
  • Highway rehabilitation and maintenance projects at daytime causing congestion.
RISKS INVOLVED IN NIGHTTIME WORK ZONES

A. Safety Risks
B. Cost Risks
C. Productivity Risks
D. Schedule Risks
E. Quality Risks
F. Organizational Relationship Risks
G. Technical Risks
H. Logistical Risks
A. SAFETY RISKS

The **major** nighttime **work zone safety** risks are:

- Vehicle intrusions into work zone
- Workers struck by construction equipment
- Construction equipment intrusion in operational traffic lanes
- Irresponsible driver behavior
- High speeds
- Driver confusion
- Poor visibility
- Irresponsible worker behavior
B. COST RISKS

**Costs** of nighttime projects can be **increased** by

- Need for more traffic control measures
- Labor premiums
- Material premiums

**Costs** of nighttime projects can be **decreased** by

- Less delivery cost
- Less user cost due to fewer delays and substantial time savings
C. PRODUCTIVITY RISKS

Productivity of night work may be reduced by

• Inadequate lighting

• Poor visibility

• Poor worker morale and fatigue

• Problems with availability and supply of materials

• Extra time required to set-up & take-down traffic control devices
D. SCHEDULE RISKS

*Schedule risks* may *arise* due to

- Delays in setting up traffic control and lighting systems
- Worker accidents
- Restricted availability of necessary equipment
- Lack of coordination among inspectors and engineers regarding day activities on projects with night work
E. QUALITY RISKS

Quality of nighttime work can be affected due to (similar to those affecting productivity)

• Poor visibility
• Lighting deficiencies
• Difficulty of achieving good supervision and inspection
• Poor worker morale
• Suitability of nighttime temperatures to work activities

DECREASES  INCREASES
Organizational relationship risks stem from

• Different work hours of nighttime versus daytime

• The lack of communication among project participants

• Poor relationships between project participants

Note: It is extremely important to communicate any project variations or changes with the necessary parties to prevent failure of the project.
Technical risks mainly arise due to

- **Technical questions** may not be resolved expeditiously at night – also affects project schedule and costs

- **Designs** sometimes fail to appreciate the circumstances of nighttime work

- **Project specifications** of speedy construction may not be modified for the differences in nighttime from daytime
H. LOGISTICAL RISKS

Logistical risks mainly arise due to:

• Unavailability of equipment and materials at night

• Unavailability of material suppliers as their business hours do not commonly extend into the night

• If arrangements are made for deliveries, the prices are generally higher

• Unavailability of resources for conducting nighttime construction – either a particular piece of construction equipment, spare parts, fuel, or mechanical support
FACTORS / CAUSES OF NIGHTTIME RISKS

Factors that **impact the feasibility and suitability of night work** and are **possible causes for the risks involved** in nighttime construction are

A. Traffic
B. Construction
C. Social
D. Economic
E. Environmental
A. TRAFFIC

• Geometric Restrictions (lane closures) and inadequate traffic control in active and inactive work zones **INCREASES** nighttime crashes.

• Rear-end crashes **OCCUR MORE FREQUENTLY** during nighttime work activity.

• Reduced congestion at night **affects safety** due to:
  • Uncontrolled speeds
  • Impaired drivers & pedestrians
B. CONSTRUCTION

Construction related risks mainly include

- **Productivity** Risks
- **Quality** Risks

**CAUSES:**

1. Reduced visibility in dark
2. Communication difficulties among project partners at night
3. Long set-up /take-down times for traffic controls and lighting
C. SOCIAL

- Major **HUMAN FACTORS** affected by nighttime construction:
  - Sleep deprivation
  - Irregular eating habits
  - Long working hours
  - Commuting difficulties
  - Social and domestic issues

- Higher number of **IMPAIRED** driver and pedestrians at night

- Workers are **INATTENTIVE** due to fatigue, sleeplessness
D. ECONOMIC

Construction costs increase due to:
- Overtime and night-premium pay
- Lighting expense
- Added traffic control costs
- Increased material costs

User costs decrease due to:
- Lower vehicle operating costs
- Substantial time savings during delivery

FEWER DELAYS

Accident costs may be higher / lower:
- Poor visibility
- Higher speeds
- Traffic control options at night
- Lower Traffic volumes

HIGH

LOW
E. ENVIRONMENTAL

• Effective **PUBLIC RELATION** efforts help to keep motorists and residents informed regarding traffic plans and impacts on the community

• Adequate **LIGHTING** is essential, both to ensure
  - work quality and productivity
  - safety of workers and travelers

• **COMMUNITY CONCERNS** associated with night work include
  - noise
  - glare from work lights
  - changes in traffic patterns impacting residential neighborhoods
CONCLUSION

• The research identifies
  ▶ The different types of risks involved in nighttime work zones
  ▶ The factors responsible for occurrence of such types of risks

• But the results **should not be followed blindly** for all projects as each
  **CONSTRUCTION PROJECT IS UNIQUE.**

• The types of **risks involved vary** according to
  ▶ Type of project
  ▶ Site conditions
  ▶ Contract types
  ▶ Contractors and sub-contractors involved
  ▶ Political scenario
QUESTIONS??

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THANK YOU !!