Urban Hazards: Beyond Traditional Safety

Presented by:
Cynthia Braun, CSP, CHMM, CET
Braun Safety Associates, LLC
Littleton, Colorado USA
www.braunsafety.com

Minnesota Safety Council
Safety & Health Conference
Minneapolis Convention Center
May 8, 2018
2:00 p.m. - 3:00 p.m.
CYNTHIA E. BRAUN
CSP, CET, CHMM

Braun Safety Associates, LLC
9882 West Unser Avenue
Littleton, Colorado USA
303-933-9028
www.braunsafety.com
Session Objectives

After attending this session, participants should be able to:

- Explain the term “urban hazards”
- Name three workforces who face urban hazards
- Identify traditional and nontraditional hazards of working in urban environments
- Identify at least three chemical hazards associated with methamphetamine labs
- Summarize hazards of homeless encampments
- Identify possible safety management strategies and control methods to protect workers in urban environments
Working in Urban Environments
Term: Urban Environment

Broad term to represent:

- Densely developed metropolitan areas
- Census Bureau
  - “Urbanized Areas”
  - “Urban Clusters”
- Residential, commercial, public, non-residential, land/property
- Rural areas – similar hazards can occur
Term: “Urban Hazards”

Broad term to represent:

- Unexpected hazards created by unique circumstances
- “Non-traditional”
- Not found in CFR!
- Can be categorized within traditional hazard categories:
  - Physical
  - Chemical
  - Biological
  - Ergonomic
  - Human-related
Work Forces Affected

- Law enforcement
- Security personnel
- Emergency responders
- Healthcare, hospitals, clinics
- Urban planners, infrastructure design & management
Work Forces Affected

- Construction and trades workers
- Concrete, asphalt paving crews
- Facility maintenance workers
- Building inspectors, surveyors
- Service/install crews, HVAC
- Property management personnel, acquisition agents, hotels, resorts
Work Forces Affected

- Lawn and tree care, fencing industries
- Municipal workers – city, county, state
- Right-of-way workers
- National parks workers, rangers
- Transportation and delivery workers
- Utility crews, utility locators
Work Forces Affected

- Drilling companies – directional, oil and gas, environmental
Work Forces Affected

- Retail store employees
- Charitable organizations
- Volunteer roadside cleanup
- Sanitation workers
- Environmental & safety consultants
Hazard and Risk Assessment
Hazard and Risk Assessment

1. Physical Hazards
2. Chemical Hazards
3. Biological Hazards
4. Ergonomic Hazards
5. Human Factors
Hazard and Risk Assessment

Traditional Hazard Assessment Categories

1. **Physical Hazards**: slips/trips/falls, falls, electrical, mechanical, thermal, pinch points, struck-by, struck against, caught in/between, pressure, engulfment, radiation, sharp objects/edges, noise

2. **Chemical Hazards**: liquid, solid, gas, vapor, particulates, semi-solid, sludge
Hazard and Risk Assessment

Traditional Hazard Assessment Categories

3. Biological Hazards: animals, insects, plants, bloodborne pathogens

4. Ergonomic Hazards: awkward postures, vibration, overexertion, repetitive motion, contact stress

5. Human Factors: fatigue, stress, behavior, psychology
Hazard and Risk Assessment – “Urban Hazards”

“Non-traditional” Hazards

- Unique
- Not always predictable or obvious
- Not covered in CFR
- Usually human-caused
- Hard to identify, unexpected
- Hard to preplan in advance
Case Study: Hazards of Homeless Encampments
Introduction to Homeless Encampments

- Short or long-term residence
- Make-shift shantytowns and tent cities
- From one to several dozen residents
Introduction to Homeless Encampments

Located where individuals:

- can seek personal shelter
- are protected from weather
- are out of sight
- are close to goods, services, and resources (e.g., food, alcohol, transportation, walking paths, employment opportunities)
Locations of Homeless Encampments

Examples

- Around heat sources and vents
- Campgrounds
- Parks
- Alleys, streets
- Vacant/abandoned property and buildings
- Under bridges and overpasses
- Inside viaducts
- Right-of-ways
- Empty/open trucks, railcars
- Vehicles, RVs
- Near overgrown brush and vegetation
Locations of Homeless Encampments

Examples (cont’)

- Dumpsters
- Public transportation systems
- Public restrooms
- Trash compactors, balers
- Stairwells, lobbies
- Rooftops
- Parking ramps
- Commercial establishments
- Along waterways
- On or near bike/pedestrian paths
Different types of residents: “travelers” vs. “homegrown”
Residents can be convicted felons or persons with outstanding warrants
Trash
Pets
Feral cats, dogs
Case Study: Homeless Encampment
Hazard and Risk Assessment

1. Physical Hazards
2. Chemical Hazards
3. Biological Hazards
4. Ergonomic Hazards
5. Human Factors
“Non-traditional” Hazards

1. Physical Hazards
   - Cuts/lacerations from sharp objects
     - on ground, buried, bushes
     - sticking out of bags/containers
     - garbage, glass
     - fencing, barriers
     - sabotage
Hazard and Risk Assessment

“Non-traditional” Hazards

1. Physical Hazards
   - Electrical, utilities
     - exposed underground utilities
     - missing electrical panel covers
     - poorly wired circuits
     - live electrical connections from exposed wiring
     - connections to transformers compromised
     - batteries
Hazard and Risk Assessment

“Non-traditional” Hazards

1. Physical Hazards

- Struck-by: traffic, heavy equipment, falling debris, roadside debris, bicycles, objects thrown from vehicles
- Weak/deteriorating structures, stairs, flooring
Hazard and Risk Assessment

“Non-traditional” Hazards

1. Physical Hazards (cont’)
   - Falls from height
   - Slips/trips/falls: poor lighting, trash, ground features, debris, slippery surfaces/substances, unstable footing, bodies, traps
Hazard and Risk Assessment

“Non-traditional” Hazards

1. Physical Hazards (cont’)
   - Explosion: compressed cylinders, chemical reactions
   - Fire: hazardous materials, sterno, camp fires, wood stoves, grills, compactors and containers
“Non-traditional” Hazards

1. Physical Hazards

- Assault: street violence, crime, gangs, confrontations, protesters, robbery
  - CDOT – startled homeless person pulled knife
  - ARC Thrift – stabbing outside Denver store, hostage standoff nearby business, gang activity in parking lot
  - Colo. Geological Survey
  - Dakota Access Pipeline, North Dakota demonstration
“Non-traditional” Hazards

1. Physical Hazards
   - Sabotage
     - Stockton, CA – 12 incidents of snapped fiber optic cables
   - Suicide – public, fellow employee, terrorist
2. Chemical Hazards - hazardous materials

- Abandoned buildings
- Contractor chemicals
- Asbestos, lead
- Alcohol, ammunition, aerosols
- Universal waste - mercury bulbs, batteries
- Meth labs
## Hazard and Risk Assessment

### “Non-traditional” Hazards

Methamphetamine (meth) labs

<table>
<thead>
<tr>
<th>What is Meth?</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Crystal</td>
<td>Crystal meth</td>
</tr>
<tr>
<td>Speed</td>
<td>Crank</td>
</tr>
<tr>
<td>Glass</td>
<td>Cat</td>
</tr>
<tr>
<td>Ice</td>
<td>Christi</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Honey</th>
<th>Dreams</th>
<th>Clouds</th>
<th>Peanut Butter</th>
</tr>
</thead>
</table>

Meth recipes – most popular are the **nazi, shake and bake, and birch methods**
Hazard and Risk Assessment

“Non-traditional” Hazards

Meth labs (cont’)

- Hazardous materials
  - Flammable, explosive liquids and gases
  - Caustics
  - Acids
  - Gases
  - Reactions
Chemical Hazards – meth labs (cont’)

- Ephedrine/Pseudoephedrine cold tablets or diet pills
- Anhydrous ammonia
- Starter fluid (ether)
- Muriatic or sulfuric acids, lye (drain cleaners)
- Solvents – e.g., toluene, naphtha, camping fuel, paint thinner, freon, acetone
Chemical Hazards – meth labs (cont’)

- Denatured alcohol, rubbing alcohol, or gas line anti-freeze
- Methanol (Heet)
- Red phosphorous
- Iodine crystals
- Hydrochloric acid
- DMSO2 or MSM (Animal nutritional supplement)
- Pool chlorine
Chemical Hazards – meth labs (cont’)

- Corrosive NH3 causes cylinder and valves to fail
- Danger of explosion and release of gas
- NH3 destroys lung’s lining and mucus membranes
Locations of meth labs:
- Houses
- Businesses
- Hotel Rooms
- Apartments
- Garages
- Barns
- Storage Facilities
- Fields
- Remote Locations
- Cars, RVs
Hazard and Risk Assessment

“Non-traditional” Hazards

3. Biological Hazards
- Old landfill & cemeteries
- Bed bugs, lice
- Garbage, food waste
- Animal feces, carcasses
- Animal bites (e.g., pets, stray animals, rats)
Hazard and Risk Assessment

“Non-traditional” Hazards

3. Biological Hazards
- Needles, syringes, sharps
- Human body fluids, urine, feces, vomit, blood, mucous
  - CDOT skid loader
- Human contact: persons with lesions and infections, HIV/HBV/TB
  Methicillin-resistant Staphylococcus Aureus (MRSA)
- Human corpses
  - “Thunderdome” homeless encampment in Denver
Hazard and Risk Assessment

“Non-traditional” Hazards

4. Ergonomic Hazards
   - Awkward postures, reaching
   - Heavy lifting of odd-shaped and odd-sized objects
   - Forcing objects into containers
   - Holding objects away from body
Hazard and Risk Assessment

“Non-traditional” Hazards

4. Ergonomic Hazards
   - Quick movements
   - Sudden reactions
   - Awkward posture
   - Slip/trip
Hazard and Risk Assessment

“Non-traditional” Hazards

5. Human Factors

- Human interaction, approached by
- Persons under influence of substances
- Persons with mental illness
- Erratic, unpredictable behavior
Hazard and Risk Assessment

“Non-traditional” Hazards

5. Human Factors
- Aggressive persons
- Startled persons
- Protesters
- Imposters
“Non-traditional” Hazards

5. Human Factors

- Panhandlers
- Intruders
- Robbery, theft, stolen property
- Weapons
- Gang activity
- Crime nearby
- Shoplifters
- Employee theft
- Counterfeiters
- Odors!
Safety Management Strategies to Protect Workers in Urban Environments

General Recommendations
Safety Management Strategies for Working in Urban Environments

1. **Conduct hazard and risk assessments of tasks**
   a. Facilities, off-site buildings, storage
   b. Yards
   c. Field operations
   d. Project sites
   e. Contractor/subcontractor sites
   f. Stores, public interface

**HOW?** Jobsite observations
   - Ride-alongs
   - Interviews with employees
   - Community research
   - Contact local law enforcement
   - Pre-bid meetings, site walkthrough/recon
Safety Management Strategies for Working in Urban Environments

2. Written policies, programs, procedures

1. Based on results of hazard and risk assessments
2. Hazard controls – Anticipation/Planning/Protection
   a. Pre-project: AHA/JHA/THA, site safety plan, safe work permits, HAZWOPER site safety plan, reconnaissance
   b. Pre-task: real-time JSA, plan of the day, field level hazard assessment (FLHA), tailgate talk, recurring huddles, postings
   c. Communication plan: buddy system, check in/check out, communication, site security, facility security systems, radio checks
   d. Use of experienced supervisors, safety staff, leaders
   e. Equipment inspections & checks
   f. PPE
3. Roles & responsibilities
## Safety Management Strategies

### Physical Hazards

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Strategy/Precaution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assault</td>
<td>Designated staging areas</td>
</tr>
<tr>
<td>Sabotage</td>
<td>Established paths/walkways</td>
</tr>
<tr>
<td>Electrical, utilities</td>
<td>Use of heavy equipment – loaders, bobcats</td>
</tr>
<tr>
<td>Fire</td>
<td>Lock or turn off exterior power outlets, panels</td>
</tr>
<tr>
<td>Explosion</td>
<td>Lock or remove handles from water spigots</td>
</tr>
<tr>
<td>Weak/deteriorating structures</td>
<td>Traffic control</td>
</tr>
<tr>
<td>Unstable walking/working surfaces</td>
<td>Pedestrian control</td>
</tr>
<tr>
<td>Slips/trips/falls</td>
<td>Flagging, flaggers</td>
</tr>
<tr>
<td>Struck-by</td>
<td>Clearing brush, excess foliage</td>
</tr>
<tr>
<td></td>
<td>Buddy system, team approach</td>
</tr>
<tr>
<td></td>
<td>Site security plan</td>
</tr>
<tr>
<td></td>
<td>Hands off approach - “do not touch”</td>
</tr>
<tr>
<td></td>
<td>Daily walkthrough surveys</td>
</tr>
<tr>
<td></td>
<td>Utility locates</td>
</tr>
<tr>
<td></td>
<td>Training</td>
</tr>
<tr>
<td></td>
<td>Fire extinguishers</td>
</tr>
<tr>
<td></td>
<td>Spill kits</td>
</tr>
<tr>
<td></td>
<td>Kevlar vests</td>
</tr>
<tr>
<td></td>
<td>PPE</td>
</tr>
</tbody>
</table>

**Note:**
- RED: ELECTRIC
- YELLOW: GAS, OIL, STEAM
- ORANGE: COMMUNICATIONS
- BLUE: POTABLE WATER
- PURPLE: RECLAIMED WATER
- GREEN: SEWER / DRAINAGE
- PINK: SURVEY MARKS
- WHITE: PROPOSED EXCAVATION
<table>
<thead>
<tr>
<th>Chemical Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methamphetamine (meth) labs</td>
</tr>
<tr>
<td>Propane gas cylinders</td>
</tr>
<tr>
<td>“Death bags”</td>
</tr>
<tr>
<td>Hazardous materials</td>
</tr>
<tr>
<td>Asbestos</td>
</tr>
<tr>
<td>Alcohol</td>
</tr>
<tr>
<td>Lead</td>
</tr>
<tr>
<td>Universal wastes</td>
</tr>
<tr>
<td>Electronic waste</td>
</tr>
<tr>
<td>Hands off approach - “do not touch”</td>
</tr>
<tr>
<td>Notifying authorities</td>
</tr>
<tr>
<td>Specially trained hazmat teams, spill response teams</td>
</tr>
<tr>
<td>Hazardous waste management company</td>
</tr>
<tr>
<td>Secured hazmat storage</td>
</tr>
<tr>
<td>Segregation of materials</td>
</tr>
<tr>
<td>Designated staging areas</td>
</tr>
<tr>
<td>Work area marking</td>
</tr>
<tr>
<td>Meth lab training</td>
</tr>
<tr>
<td>RCRA/DOT training</td>
</tr>
<tr>
<td>E-waste training</td>
</tr>
<tr>
<td>PPE</td>
</tr>
<tr>
<td>Spill kits</td>
</tr>
</tbody>
</table>
# Safety Management Strategies

## Biological Hazards

<table>
<thead>
<tr>
<th>Biological Hazards</th>
<th>Management Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human waste, body fluids</td>
<td>Hands off approach - “do not touch”</td>
</tr>
<tr>
<td>Human contact</td>
<td>Automation of tasks – garbage trucks, sidewalk sweepers</td>
</tr>
<tr>
<td>Human corpses</td>
<td>Use tools, shovels, rakes</td>
</tr>
<tr>
<td>Needles, syringes, sharps</td>
<td>Use heavy equipment – loaders, bobcats</td>
</tr>
<tr>
<td>HIV/HBV/TB</td>
<td>Power washing</td>
</tr>
<tr>
<td>MRSA</td>
<td>Dust suppression</td>
</tr>
<tr>
<td>Garbage</td>
<td>Use of sturdy bags and containers</td>
</tr>
<tr>
<td>Food waste</td>
<td>Hold objects and containers away from body</td>
</tr>
<tr>
<td>Old landfill waste</td>
<td>Scheduling by seasons, time of day</td>
</tr>
<tr>
<td>Animal feces, carcasses</td>
<td>Clearing brush, excess foliage</td>
</tr>
<tr>
<td>Animal bites</td>
<td>Specialty cleanup company</td>
</tr>
<tr>
<td>Bedbugs</td>
<td>Decontamination process</td>
</tr>
<tr>
<td>Lice</td>
<td>Hand sanitizer</td>
</tr>
</tbody>
</table>

**PPE, respiratory protection**

**HBV vaccination**

**First aid kit**

**Biohazards kit**

**Sharps containers**

**Biohazard Spill Kit**
## Safety Management Strategies

<table>
<thead>
<tr>
<th>Ergonomic Hazards</th>
<th>Strategies to Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awkward postures</td>
<td>Weight limits for lifting</td>
</tr>
<tr>
<td>Reaching</td>
<td>Weight and size limits for packaging/containers</td>
</tr>
<tr>
<td>Quick movements</td>
<td>Use of sturdy bags and containers</td>
</tr>
<tr>
<td>Sudden reactions</td>
<td>Tommy lifts</td>
</tr>
<tr>
<td>Heavy lifting</td>
<td>Automation of tasks</td>
</tr>
<tr>
<td>Lifting and moving odd-shaped and odd-sized objects</td>
<td>Mechanical lifting devices</td>
</tr>
<tr>
<td>Holding objects away from body</td>
<td>Dumpsters with door/low access</td>
</tr>
<tr>
<td></td>
<td>Staging, proximity</td>
</tr>
<tr>
<td></td>
<td>Work area design</td>
</tr>
<tr>
<td></td>
<td>Deliberate footing/steps</td>
</tr>
<tr>
<td></td>
<td>Routes established</td>
</tr>
<tr>
<td></td>
<td>Fluorescent clothing</td>
</tr>
<tr>
<td></td>
<td>Flashlight</td>
</tr>
<tr>
<td></td>
<td>Verbal approach</td>
</tr>
</tbody>
</table>
## Safety Management Strategies

<table>
<thead>
<tr>
<th>Human Factors</th>
<th>Knowledge and Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human interaction, being approached</td>
<td>Know the area – do homework</td>
</tr>
<tr>
<td>Aggressive persons</td>
<td>Talk to Community Relations Officer (CRO) in local police departments</td>
</tr>
<tr>
<td>Persons under influence of substances</td>
<td>Park away from questionable areas</td>
</tr>
<tr>
<td>Persons with mental illness</td>
<td>Stay close to vehicle, escape routes, storefronts</td>
</tr>
<tr>
<td>Unpredictable behavior</td>
<td>Avoid confrontation, don’t engage with strangers</td>
</tr>
<tr>
<td>Startled persons</td>
<td>Buddy system, team approach</td>
</tr>
<tr>
<td>Imposters</td>
<td>Verbal approach - announce self with loud voice</td>
</tr>
</tbody>
</table>

### Communication plan
- Radio/cell phone checks prior to work
- Do not offer food or money
- Do not pursue or “give chase” to shoplifters, violators

### Emergency plan
- Call police, supervisor
- Flashlight, lighting

---

*Image 1: Three individuals in safety vests, possibly a group of workers or inspectors.*

*Image 2: A fenced area with a building in the background.*
## Safety Management Strategies for Working in Urban Environments

### Human Factors (cont’)

<table>
<thead>
<tr>
<th>Crime-related:</th>
<th>Actions</th>
</tr>
</thead>
</table>
| Gang activity | Delineate work areas  
| Panhandlers    | Post signs  
| Shoplifters   | Fencing, walls, barriers, markings, cones  
| Counterfeiter | Sufficient lighting of work and storage areas  
| Intruders     | Motion-activated lighting  
| Imposters     | Security cameras  
| Theft         | Video analytics or intelligent video software (if full-time monitoring of camera system not possible)  
| Stolen property | Dashcams  
| Weapons       | Portable cellular security alarm systems (e.g., “Tattletale” for trailer & property security cameras)  

### Crime-related:
- Gang activity
- Panhandlers
- Shoplifters
- Counterfeiter
- Intruders
- Imposters
- Theft
- Stolen property
- Weapons

### Security Measures:
- Delineate work areas
- Post signs
- Fencing, walls, barriers, markings, cones
- Sufficient lighting of work and storage areas
- Motion-activated lighting
- Security cameras
- Video analytics or intelligent video software (if full-time monitoring of camera system not possible)
- Dashcams
- Portable cellular security alarm systems (e.g., “Tattletale” for trailer & property security cameras)
- Badge & ID system
- Lock fences/gates, dumpsters, buildings, storage sheds, yards, lots
- Post personnel at access points
- Security plan
- Contracted security staff
- Scheduled security patrols
- Graffiti-resistant paint, anti-graffiti coatings
Safety Management Strategies for Working in Urban Environments

Human Factors (cont’)

Retail:
- Hours of operation
- Lockdown procedures
- Buddy system, GPS locator APP
- Storefront and floor layout designs
- Compactor/baler walkarounds and warning stickers
- Sku system to prevent theft by employees
- Procedures for opening and closing
- Hired security
- Store manager onboarding/training
Safety Management Strategies for Working in Urban Environments

3. Emergency readiness and response
   a. Communication plan – all points
   b. Field, facility, project sites
   c. Motor vehicle, heavy equipment
   d. Community emergencies, lockdown

4. Communication systems and plans
   a. Facility lights, alarms, phones, radios, backup, cell phone networks
   b. Current/accurate contact list: local authorities, community resources
   c. Equipment checks, backup plans, verbal, visual
   d. Buddy system, check in/check out requirement
Safety Management Strategies for Working in Urban Environments

5. Security – systems & personnel
   • Buildings, vehicles, trailers, storage units
   • Equipment inspections (e.g., alarms, gates, cameras)
   • Badges, form of ID

6. Employee training and communication
   a. Project/task pre-planning, AHA/JHA/THA, JSA/FLHA
   b. Hazard identification, controls, 360 awareness
   c. Security protocol
   d. Emergency preparedness & response, drills
   d. Incident reporting

7. Do Your Drills – facilities, field operations, project sites
Conclusion

- Urban environments pose traditional and non-traditional hazards
- Hazard and risk assessments needed: field & facility
- Training needed to develop identification skills for non-traditional hazards
- Pre-planning critical to protecting workers in urban environments; emergency readiness
- Communication plan essential before, during, after
- Worker check in/check out, buddy system+++ 
- Control measures developed with employees prior to mobilization, ongoing, JHA/AHA/JSA/FLHA
- Resources and emergency contacts readily available and verified
Urban Hazards: Beyond Traditional Safety

THANK YOU!

Celebrate Safety, Inc.
Littleton, Colorado
303-933-9028
www.coolcesafesafety.com

Braun Safety Associates, LLC
Littleton, Colorado USA
303-933-9028
www.braunsafety.com
www.celebratesafety.com
Introduction

Working in urban environments presents a wide variety of hazards and risks for employees and organizations across many industries. Hazards and risks associated with this work are often not anticipated and can be overlooked in the preplanning stages of projects and tasks. The unique, non-traditional hazards of working in urban environments come from many sources, such as homeless encampments, drug labs, criminal activity, human interaction, and animals, just to name a few. Working in urban environments can be complicated by other factors, such as needle-sharing programs, encountering stolen property, working in areas of high crime and gang activity, and the use of temporary workers by employers.

Health and safety hazards in urban environments can be encountered by workers on construction sites, city streets and parking lots, vacant or abandoned property, environmental cleanup projects, surveying and locating projects, urban campuses, right-of-ways, in retail operations, in and around commercial establishments and healthcare facilities, and in many other work locations and industries. Traditional risk assessment methods provide a starting point for evaluating potential worker exposures. However, non-traditional health and safety hazards must also be considered to fully assess worker health and safety hazards in urban environments.

This white paper provides an introduction to the identification of non-traditional health and safety hazards that can arise in urban settings, and suggestions for control methods to protect workers from potential harm. This paper is not a sociopolitical study or statement regarding causes, reasons, or remedies for the hazards and conditions that confront workers in urban environments.

Urban Environments
The Census Bureau’s urban-rural classification is a delineation of geographical areas:

- Urbanized Areas (UAs) have 50,000 or more people;
- Urban Clusters (UCs) have at least 2,500 and less than 50,000 people; and
- Rural areas encompass population, housing, and territory not included within an urban area.¹

For the purposes of this paper, the phrase “urban environments” is broadly used to represent densely developed metropolitan and rural areas, including residential, commercial, and other non-residential urban land uses.

**Working in Urban Environments**

Millions of workers are exposed to urban hazards in various work capacities. Examples of industries and workforces that are affected are listed below, although this list is far from exhaustive:

- Building inspectors
- Charitable organizations
- Construction and trades workers
- Directional drilling companies
- Emergency responders
- Engineers, Project Managers
- Environmental Consultants
- Facilities maintenance companies
- Healthcare and community care workers
- Law enforcement
- Lawn and tree care industry workers
- Municipal workers – city, county, state
- Oil and gas operations
- Property management personnel
- Right-of-way workers
- Retail stores
- Sanitation workers
- Security personnel
- Surveyors and locators
- Transportation workers
- Urban Planners
- Utility crews

**Hazards of Working in Urban Environments**

When assessing the health and safety hazards of working in urban environments, “traditional” and “non-traditional” hazards must be considered. These terms are discussed below.

**Traditional Hazards**

“Traditional” hazards of working in urban environments are those commonly known and used in workplace safety programs for hazard assessments, safety training, and safety procedures.

Examples are presented below; this list is not exhaustive:

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Examples of Traditional Hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physical Hazards</td>
<td>Fall from heights, slip/trip/fall, electrical, mechanical, thermal, noise, pinch points, struck-by, struck against, caught in between, pressure, engulfment, sharp objects and edges, radiation</td>
</tr>
<tr>
<td>2. Chemical Hazards</td>
<td>liquid, gas, vapor, particulates, solid, semi-solid, sludge</td>
</tr>
<tr>
<td>3. Biological Hazards</td>
<td>animals, insects, plants, bloodborne pathogens</td>
</tr>
<tr>
<td>4. Ergonomic Hazards</td>
<td>awkward postures, overexertion, repetitive motion, vibration, contact stress</td>
</tr>
<tr>
<td>5. Human Factors</td>
<td>fatigue, stress</td>
</tr>
</tbody>
</table>
Non-traditional Hazards

“Non-traditional” hazards of working in urban environments may not be as obvious to workers, safety professionals, and project managers. They include hazards created by urban conditions, persons, and activities. They can be easily overlooked during project/task risk assessments, and workers must be trained to identify them. Examples of “non-traditional” hazards of working in urban environments are presented in Table 1; this table is not exhaustive.

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>“Non-traditional” Hazards of Working in Urban Environments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physical Hazards</td>
<td>Assault – street violence, crime, gangs Electrical - exposed underground utilities, missing electrical panel covers, live electrical connections from exposed wiring, connections to transformers Explosion - compressed cylinders, chemical reactions Fire - camp fires, wood stoves, grills, hazardous materials, sterno Cuts/lacerations from sharp objects sticking out of bags/containers Weak/deteriorating structures Slips/trips/falls from poor lighting, ground features, debris and trash Unstable walking/working surfaces</td>
</tr>
<tr>
<td>2. Chemical Hazards</td>
<td>Methamphetamine (meth) labs Propane gas cylinders “Death bags” – garbage or plastic bags with offgas from meth production Hazardous materials Alcohol Universal waste - mercury bulbs, asbestos, batteries</td>
</tr>
<tr>
<td>3. Biological Hazards</td>
<td>Human waste – urine, feces, vomit, blood, body fluids Human contact – persons with lesions and infections Human corpses Methicillin-resistant Staphylococcus aureus (MRSA) Needles and syringes Food waste, food-borne diseases Animal feces, carcasses Animal bites (e.g., pets, stray animals, rats) Bedbugs, lice Old landfill waste</td>
</tr>
<tr>
<td>4. Ergonomic Hazards</td>
<td>Awkward postures, reaching Heavy lifting of odd-shaped and odd-sized objects Holding objects away from body Quick movements and reactions</td>
</tr>
<tr>
<td>5. Human Factors</td>
<td>Human interaction - Aggressive persons - Persons under the influence of substances - Persons with mental illness - Unpredictable behavior - Startled persons Gang activity Panhandlers Shoplifters, employee theft Counterfeiters</td>
</tr>
<tr>
<td>Intruders</td>
<td>Stolen property</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Weapons</td>
<td>Odors</td>
</tr>
<tr>
<td>Crime (broad range)</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. In addition to traditional hazards, non-traditional hazards of working in urban environments must be considered during project and task pre-planning. This list is an introduction to hazards, and is not exhaustive.

Exhibits 1. and 2. Weak structures and ground debris present physical hazards to workers.

Exhibits 3. Workers at charitable organizations, such as this thrift store donation station, encounter unique hazards when storing, unloading, and sorting donated goods. Hazards, such as human body fluids and waste, hazardous materials, needles/sharp objects, and homeless persons seeking shelter are some of the hazards that affect these workers.
Homeless Encampments

The U.S. Department of Housing and Urban Development (HUD) classifies homeless persons in two categories: sheltered and unsheltered. A "sheltered" homeless person lives in an emergency shelter or transitional housing, such as domestic violence shelters; residential programs for homeless or runaway youth; or a hotel, motel or apartment paid for with a voucher provided by a governmental or private agency. An unsheltered homeless person lives in "a place not meant for human habitation, such as cars, parks, sidewalks, abandoned buildings, or on the street." About 44 percent of homeless people are unsheltered.

Locations of Homeless Encampments

Homeless encampments are commonplace in most U.S. cities. Homeless encampments are typically located where individuals can seek personal shelter, be out of sight, and be protected from the weather. Examples of locations where homeless encampments are found include: campgrounds, parks and alleys, vacant property, vacant and abandoned buildings, under bridges and overpasses, inside viaducts, on right-of-ways, around heat sources and vents, in empty trucks and train cars, near overgrown brush and vegetation, along waterways, and adjacent to pedestrian paths. Some individuals use facilities and structures for short or long-term residence, such as dumpsters, public transportation systems, public restrooms, vehicles, trash compactors, balers, stairwells, rooftops, parking ramps, make-shift shantytowns and tent cities, and commercial establishments.

Encampments are usually located close to goods, services, and resources that people need, such as food, alcohol, transportation, walking paths, and employment opportunities. These temporary “homes” can have from a few to several dozen residents and their pets. Often, encampment residents are convicted felons or persons with outstanding warrants.

Exhibit 4. Homeless encampments are typically located where individuals can seek personal shelter, be out of sight, and be protected from the weather. Encampments are often located close to goods, services, and resources that individuals need to live.
Hazards of Homeless Encampments
Homeless encampments bring a distinct set of environmental and safety hazards to the areas inhabited. Table 1 contains examples of the health and safety hazards associated with homeless encampments.

Dismantling and Cleanup of Homeless Encampments
Workers who dismantle and cleanup encampments are directly in the path of safety and health dangers. Cleanup efforts must be executed in an organized manner, and planned well in advance of the event. Because of the hidden dangers and unique hazards associated with encampments, persons involved in cleanups must be trained to recognize health and safety hazards, and methods to avoid personal injury and illness.

Pre-planning for worker safety must take place in advance because of the logistics involved. Establishing a team approach and chain-of-command is essential for a successful cleanup at these sites, starting with local law enforcement sweeps of the encampment. During sweeps, police officers check for persons who may still inhabit the encampment, stolen property, drug labs, residents’ personal possessions, and other dangers they may recognize.

Encampment cleanups are a team effort between the police department, other agencies, and private sector services, based on needs of the project. For example, homeless encampment cleanups in Denver, CO, such as on a right-of-way along a major metropolitan highway, can include some or all of the following participants:

1. Denver Police Department,
2. Colorado Department of Transportation (CDOT),
3. City and County of Denver Homeless Outreach Team (HOT),
4. City of Denver Public Works Solid Waste Department,
5. City of Denver Parks Rangers (Parks & Recreation),
6. City of Denver Fire Department, including hazardous materials specialists,
7. Colorado Department of Public Health and Environment (CDPHE),
8. Colorado Department of Corrections prison crews,
9. Hazardous waste management contractor,
10. Hazardous waste cleanup contractor,
11. Xcel Energy (public utilities services), and
12. Tow truck operators.

Safety Management Strategies
Commonly, workplace safety programs do not sufficiently anticipate, recognize, evaluate, or mitigate the hazards and risks posed by working in urban areas. As a minimum, employers should have written policies, programs, and procedures that specifically address traditional and non-traditional hazards (in either field or facility work environments). Employee training is a must to assure that workers can anticipate and identify the types of hazards that can arise. Training must include protective measures to minimize employee potential for injury and illness, and explicit instructions for emergency readiness and response. During project/task work, risk assessment methods should be used, such as job safety analysis (JSA) or task hazard analysis (THA), plan-of-the-day, project risk assessments, pre-task safety plans, and site safety plans.
General recommendations are presented below for managing and mitigating the non-traditional health and safety hazards and risks of working in urban environments. These recommendations serve as an introduction to hazard management; they are general/minimal. Each project site, facility, and work/task situation must be evaluated for the appropriateness of these recommendations, and to determine the engineering, administrative, work practice, and equipment controls needed to protect workers.

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Hazards of Working in Urban Environments</th>
<th>Safety Management Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physical Hazards</td>
<td>Assault – street violence, crime, gangs Electrical - exposed underground utilities, missing electrical panel covers, live electrical connections from exposed wiring, connections to transformers Explosion - compressed cylinders, chemical reactions Fire - camp fires, wood stoves, grills, sterno, hazardous materials Weak/deteriorating structures Unstable walking/working surfaces Slips/trips/falls from poor lighting, ground features, building debris</td>
<td>Automation of tasks – garbage trucks, sidewalk sweepers Buddy system, team approach Clearing brush, excess foliage Use of heavy brush, excess foliage Locks on electrical panels and other equipment Security - lighting of work and storage areas - security cameras - fencing, walls - locking of fences, vacant lots, buildings, storage areas - hired security staff - security patrols - signage and warnings - posting of personnel Fire extinguishers Designated staging areas Established paths/walkways Personal protective equipment</td>
</tr>
<tr>
<td>2. Chemical Hazards</td>
<td>Methamphetamine (meth) labs Propane gas cylinders “Death bags” – garbage or plastic bags with offgas from meth production Hazardous materials Alcohol Universal waste - mercury bulbs, asbestos, batteries</td>
<td>Dust suppression Securing hazardous materials Spill kits Segregation of materials Specially trained teams Hazardous waste management company (experts) Designated staging areas Personal protective equipment</td>
</tr>
<tr>
<td>3. Biological Hazards</td>
<td>Human waste – urine, feces, vomit, blood, body fluids Human contact – persons with lesions and infections Human corpses Methicillin-resistant Staphylococcus aureus</td>
<td>Hands off approach - “do not touch,” hold away from body Use of tools, shovels, rakes Use of heavy equipment – loaders, bobcats First aid kits</td>
</tr>
<tr>
<td></td>
<td>(MRSA) Needles and syringes</td>
<td>Biohazards kit Sharps containers Dust suppression Use of sturdy bags and containers Scheduling by seasons, time of day Clearing brush, excess foliage Use of dust mask or respirator HBV vaccination Personal protective equipment</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------</td>
<td>--------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Food waste, food-borne diseases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Animal feces, carcasses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Animal bites (e.g., pets, stray animals, rats)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bedbugs, lice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Old landfill waste</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td><strong>Ergonomic Hazards</strong></td>
<td><strong>Ergonomic Hazards</strong></td>
</tr>
<tr>
<td></td>
<td>Awkward postures, reaching</td>
<td>Weight limits of bags/containers Automation of tasks Mechanical lifting devices Use of sturdy bags and containers Deliberate footing/steps</td>
</tr>
<tr>
<td></td>
<td>Heavy lifting of odd-shaped and odd-sized objects</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Holding objects away from body</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quick movements and reactions</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td><strong>Human Factors</strong></td>
<td><strong>Human Factors</strong></td>
</tr>
<tr>
<td></td>
<td>Human interaction</td>
<td>Call police Call supervisor Buddy system, team approach Stay close to vehicle Verbal approach, loud voice when announcing oneself Reliable communication devices Automation of tasks Clearing brush, excess foliage Stay in close proximity to escape routes, vehicles Park away from questionable areas Do not engage with people Avoid personal encounters Do not pursue or “give chase” to shoplifters, violators, etc. Security - lighting of work and storage areas - security cameras - fencing, walls - locking of fences, vacant lots, buildings, storage areas - hire security staff - security patrols - signage - posting of personnel</td>
</tr>
<tr>
<td></td>
<td>- Aggressive persons</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Persons under the influence of substances</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Persons with mental illness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Unpredictable behavior</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Startled persons</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gang activity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Panhandlers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shoplifters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Counterfeiters</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intruders</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stolen property</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weapons</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Odors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crime (broad range)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Management of non-traditional hazards facing workers in urban environments can include the methods above. This list provides an introduction to managing these types of hazards. These ideas are basic, general, and not exhaustive. Control methods must be specific to the job/task and the working environment.

In addition to hazard management methods in Table 2., the following general precautions are offered for field and facility work. This list is not exhaustive, and project/task specific controls must be selected based on thorough risk assessments and the hazards anticipated.
1. Prior to field/facility work
   a. Facility plan or site-specific safety plan preparation (can encompass any of the elements below)
   b. Emergency planning – contact names/agencies, phone numbers, response actions, shooter/intruder plans, lockdown procedures, drills, plans with nearby resources
   c. Worker identification system – e.g., check-in/check out policy, personnel scan codes on hard hats
   d. Communications – reliable devices, contacts, primary and backup plans
   e. Research and review of historical data, current area/neighborhood data, crime rate
   f. Research of legal and liability issues, local laws
   g. Law enforcement actions required in advance- e.g., eviction preparation
   h. Permits required in advance – e.g., demo, right-of-way, asbestos abatement
   i. Site access considerations
   j. Worker orientation, training/briefing (including temporary and volunteer workers)
   k. First aid kits, bloodborne pathogens response kits
   l. Hazardous materials spill kits
   m. Decontamination supplies

2. During facility or project/task site operations
   a. Provide designated and/or secured parking for workers
   b. Real time review of the site-specific safety plan for the expected shift/work activities
   c. JSA/THA review with crews, contractors, agency reps, volunteers
   d. Tailgate talks with crews, contractors, agency reps, volunteers
   e. Use of cell phones, radios; testing of communication plans
   f. Use of law enforcement and security personnel
   g. Use of GPS personnel locator apps
   h. PPE – e.g., high visibility vest, steel toed boots, Kevlar® gloves, safety glasses, hard hat, heavy jeans, respirator, face shield, Tyvek® suit/booties
   i. Use skilled supervisors and project managers
   j. Assign full-time safety professionals for oversight
   k. Schedule the work to minimize exposure – e.g., work in daylight hours, work in winter for fewer possible encounters with homeless persons
   l. Ample lighting for conditions
   m. Post signage and warnings

3. Debrief project/task management of health and safety hazards

Exhibit 5. Workers involved with homeless encampment cleanups should wear personal protective equipment, including high visibility vest, steel toed boots, Kevlar® gloves, safety glasses, hard hat, heavy jeans, respirator (as needed), face shield (as needed), and Tyvek® suit/booties.
Conclusion

Employees who work in urban settings face traditional and non-traditional hazards and risks. The non-traditional safety and health hazards facing employees may not be sufficiently addressed by an organization’s health and safety program or management system. Even companies who systematically use hazard and risk analysis techniques may not be adequately addressing worker exposure to unknown (“surprise”) hazards. Prevention of worker harm takes place before, during, and after urban projects/tasks are conducted during field work or in facility settings. Research, pre-planning, worker training, and facility preparedness are crucial to minimize worker exposure to the hazards of working in urban environments.

Bibliography


3 Ibid.