• Emergency operations in the wildland urban interface environment require continuous situational awareness based upon the fire environment, observed fire behavior, hazards and incident objectives.

• Firefighter and public safety is paramount and must be the number one tactical consideration when engaged in the defense of infrastructure and other valuable assets.
CAL FIRE LEADER’S INTENT STATEMENT

• It is understood that the defense of these assets shall not compromise firefighter and public safety and are initiated when safe and prudent to do so realizing the threat to life and property.

• Incident containment strategies must integrate perimeter control, fire suppression, and the defense of assets concurrently.
• The most effective form of structure defense is to suppress the wildland fire.

• Perimeter control must be the number one operational priority utilizing established wildland firefighting tactics to suppress the fire before it reaches structures.

• The key to success in the Wildland Urban Interface is preparation and pre-incident planning.
• Tactical resources should take “Appropriate Actions” based on “Leader’s Intent” when communications break down.

• Operational resources assigned to defend structures not immediately threatened should be actively engaged in defense preparations. Sitting and waiting for the fire to arrive is not an option.
Property owners have a responsibility to prepare their property for structure defense by providing adequate defensible space prior to the fire emergency. (PRC 4291).

Type 3 engines are the best choice for wildland urban interface operations. However, any properly equipped engine can be an effective tool during structure defense operations.
All resources assigned to structure defense operations must be staffed with adequately trained personnel and equipped with appropriate wildland firefighting equipment.

Order the closest and deploy the most appropriate resources needed to integrate perimeter control and structure defense strategies, including engines, crews, dozers and air resources.
**CAL FIRE STRUCTURES DEFENSE TACTICAL OPERATING PRINCIPLES**

- Division Supervisors should supervise both perimeter control and structure defense operations within their geographic areas whenever possible.
- Structure Defense Groups should be assigned to geographic branches, OSC or the IC as necessary, coordinate structure defense assignments with the Division Supervisor, and should remain flexible and mobile to initiate perimeter control actions within the division if needed.
The use of STRUCTURE GROUPS and STRUCTURE BRANCHES as the DEFAULT choice for tactical structure defense operations should be minimized.
When making decisions on structure protection, you must consider the overall environment where the structures are located. There are two basic structure environments in the wildland.

- **Interface** – a condition where structures abut the wildland. There is a clear line of demarcation between the structures and the wildland fuels along roads or back fences.
  - Usually identified as housing tracts or developments adjacent to a wildland area
  - There is a greater potential for house to house ignition

- **Intermix** – a condition where structures are scattered throughout a wildland area. There is no clear line of demarcation; the wildland fuels are continuous outside of and within the developed area.
  - Each structure must be assessed independently
  - Usually more complex to triage than an interface condition
  - Usually more complex to defend than an interface condition
  - Usually requires a higher ratio of engines to structures than an interface condition
Structure Defense vs. Protection

- *Protection* implies that a structure will survive fire front impact

- *Protection* prompts firefighters to commit beyond their abilities compromising safety

- Public expectation is that firefighters will protect the structures no matter what
Structure Defense vs. Protection

- **Defense** implies that Firefighters will do their best to save a structure without compromising safety.

- The safest tactic may be to withdraw to a safe location and return to the structure after the fire front passes.
TACTICAL MANEUVER

- Implies movement or purposeful reaction to change
- Builds agility into a tactical plan
- Most effective when changes to the primary plan have been identified and reaction to those changes are planned out
TACTICAL MANEUVER

• Tactical maneuver is utilized when changing from structure defense mode to perimeter control mode

• Tactical planning must be developed in conjunction with anticipated changes in the fire environment or fire behavior

• Essential to ensure firefighter safety
TACTICAL MANEUVER

• Focus on agile tactical solutions to unanticipated changes rather than a rigid, inflexible, siege approach.

• Contingency planning should be part of every tactical plan

• Tactics change as fire behavior changes requiring tactical maneuver
TACTICAL MANEUVER

• Can be an offensive or defensive action
• Move decisively during lulls in fire activity
• Use temporary refuge areas (TRAs) or safety zones during extreme fire behavior
• Requires constant assessment of fire behavior
• Requires continuous identification of safety zones and TRAs
FIRE BEHAVIOR FORECASTING

- Use standardized references to validate fire behavior forecasts
  - IRPG
  - Look Up, Look Down, Look Around indicators
  - Extreme fire behavior indicators
    - Long range spotting
    - Sustained crown runs
    - Rapid rates of spread
  - Campbell Prediction System
FIRE BEHAVIOR FORECASTING

• Fire behavior forecasting checklist:
  – Know what the fire is doing at all times
  – Know current weather conditions and forecasts
  – Observe current fire activity, flame length and intensity
  – Consider local weather factors and fire history
  – Evaluate wind shifts, micro climates, weather indicators and other hazards
  – Evaluate fuel characteristics
ENTRAPMENT AVOIDANCE
ENTRAPMENT AVOIDANCE

• **Skills needed to avoid entrapment:**
  – Good situational awareness
  – Anticipation of fire behavior
  – Selection of safe, effective strategy and tactics
  – Decisive tactical engagement
    • When or when not to engage
  – Establishing decision points
  – Recognition of good safety zones, TRA’s and escape routes
ENTRAPMENT AVOIDANCE

• Tools:
  – Are you following the 10 Standard Fire Orders?
  – Do you recognize the 18 Watch Out Situations when they occur?
  – Do you know the “Common Denominators of Fire Behavior on Tragedy Fires” and recognize them?
ENTRAPMENT AVOIDANCE

- Entrapment avoidance tools
  - Do you ensure that LCES is used throughout the entire fire engagement?
  - Do you assess potential risks using the Risk Management process?
  - Are you using the Look Up, Look Down, Look Around indicators for fire behavior forecasts?
ENTRAPMENT AVOIDANCE

- Entrapment avoidance tools
  - Are you monitoring the air to ground frequency for aircraft alerts of potential entrapment situations?
  - Are you avoiding long, drawn out radio transmissions in an effort to keep frequencies open for alerts of potential entrapment situations?
  - Are you monitoring the fire area for thunder storm development?
ENTRAPMENT AVOIDANCE

• Entrapment avoidance tools
  – Establish decision points and make them known to all personnel
    • Decision points must be realistic
    • When the fire front reaches the decision point, is there enough time to react according to plan?
ENTRAPMENT AVOIDANCE

• Risk Management (5 Step Process IRPG)
  – Situational awareness – stay focused
  – Hazard assessment - what are the hazards?
  – Hazard control - how can they be mitigated?
  – Decision point – identify them, ensure they are known by all crew members
  – Evaluate – evaluate again and again
ENTRAPMENT AVOIDANCE

- Look Up, Look Down, Look Around
  - Fuel characteristics - moisture, temperature, continuity, and live to dead ratio
  - Terrain – especially hazardous terrain
  - Wind – local trends, general winds, and unusual wind events
  - Atmospheric stability – use the Haines Index
  - Current fire behavior

Use these criteria for fire behavior forecasts
ENTRAPMENT AVOIDANCE

• Situational Awareness
  – The continual process of collecting, analyzing and disseminating intelligence, information, and knowledge of a particular situation to allow organizations and individuals to anticipate requirements to react effectively and safely.
ENTRAPMENT AVOIDANCE

• Situational awareness is being aware of what is happening around you and understanding how information, events, and your own actions impact your objectives both now and in the future
ENTRAPMENT AVOIDANCE

Situational awareness implies that personnel:
• Understand their assignment
• Have positive accountability of subordinates
• Are aware of adjoining resources and their assignments
• Are aware of current and forecasted weather and fire behavior
• Maintain radio communications with subordinates and supervisors
• Have identified temporary refuge areas and established escape routes to safety zones
ENTRAPMENT AVOIDANCE

• The Situational Awareness Process
  – Gather relevant information about your situation
  – Be objective about what you see and hear
  – Maintain communication with your crew and adjoining forces
  – Who’s in charge of the incident, who is your branch or division?
ENTRAPMENT AVOIDANCE

• The Situational Awareness Process (cont.)
  – Study Previous/current fire behavior
  – Observe weather trends
  – Determine local factors affecting fire behavior
  – Determine evacuation needs
  – RESTAT/SITSTAT – know what others around you are doing
ENTRAPMENT AVOIDANCE

- Situational awareness— the bottom line:
  - Stay focused
  - Avoid distractions
  - Filter unnecessary information
  - Have contingency plans in place
  - React decisively
ENTRAPMENT AVOIDANCE

• Most entrapment avoidance tools are found in the IRPG and should be studied, analyzed and committed to memory

• Entrapment avoidance tools should be applied to any discussion or analysis of fatal or near miss fires
SAFETY ZONES

• Fire behavior forecasting, safety zone determination, and structure triage are interrelated

• Size and adequacy of a safety zone MUST be based on current and forecasted fire behavior
SAFETY ZONES

- Determine the adequacy of a safety zone by developing a fire behavior forecast to determine fire intensity and rate of spread.

- Determine the time required to prepare a safety zone or move to a safety zone via an escape route.
SAFETY ZONES

• By definition, a safety zone should be an area free of flammable vegetation where crews can gather safely without having to deploy a fire shelter.

• A safety zone should be at least 4 times the maximum flame height/length and must be maintained on all sides if the fire has the ability to burn around the safety zone (2010 IRPG page 7).
SAFETY ZONES

- Safety zones may not be onsite at a structure that is being defended.

- May need to be constructed or identified nearby.

- In many cases, to reach a safe area, firefighters need only drive away from the threat, putting time and distance between themselves and the fire.
SAFETY ZONES/ESCAPE ROUTES

• An identified escape route must exist and must be known by all personnel.

• If fire behavior dictates, utilize escape routes and leave early enough to reach safety zones before the fire does
SAFETY ZONES/ESCAPE ROUTES

- Without the presence of an escape route to a safety zone, firefighters cannot safely engage in structure defense, and should change tactics or redeploy to another structure.

- **DO NOT** commit to stay and defend a structure unless a safety zone for firefighters and equipment has been identified. (2010 IRPG, page 10) This may not always be practical in WUI. IRPG states that Safety Zones do not apply in WUI. IRPG page 7(IRPG contradicts itself in this version of IRPG)
TEMPORARY REFUGE AREAS (TRA)

• A *preplanned* area where firefighters may take refuge and *temporary* shelter for short-term thermal relief, without using a fire shelter in the event that escape routes to an established safety zone are compromised.
TEMPORARY REFUGE AREA (TRA)

• A TRA allows responders to develop an alternate plan to safely survive an adverse change in fire behavior.

• The major difference between a TRA and a safety zone is that a TRA requires another planned *tactical action*. 
TEMPORARY REFUGE AREAS (TRA)

• Examples: lee side of structure, inside of structure, large lawn or parking area, cab of apparatus.

• Unlike a safety zone which may be some distance away, a TRA should be available and identified on site at a defended structure.
TEMPORARY REFUGE AREA (TRA)

• Temporary Refuge Areas (TRA’s) are NOT a substitute for a Safety Zone!

• CAL FIRE and FIRESCOPE recommend pre-identifying TRAs at the defended structure. Make them known to all personnel
TEMPORARY REFUGE AREA (TRA)

• Apparatus must be positioned in a safe location, easily accessed by all personnel, with unobstructed access to the escape route

• Modern apparatus will not withstand prolonged exposure to extreme heat and should only be used for short duration refuge
TEMPORARY REFUGE AREA (TRA)

- Always have an exit strategy:
  - Employ tactical maneuver to avoid heat injury, take shelter from the fire
  - Withdraw along an escape route
  - Move into a safety zone
  - Move to a temporary refuge area
TEMPORARY REFUGE AREA
Engine

• When determining whether or not to use a vehicle as a TRA, consider:
  – Fire behavior, intensity, and rate of spread
  – Vegetation clearance around the vehicle
  – Fuel type (grass vs. heavy fuels) and loading
  – Expected duration of exposure to heat and direct flame impingement
  – Proximity to concentrated heat sources
TEMPORARY REFUGE AREA

Engine

• To prepare a vehicle for use as a temporary refuge area, firefighters should:
  – Park the vehicle facing in the direction of the escape route
  – Run the engine at a high idle (1,000 rpm if available)
  – Close all windows
  – Deploy fire shelters over windows if necessary
  – Turn on all lights including headlights and emergency lights
TEMPORARY REFUGE AREA

Engine

- Be ready to remove deployed hose lays

- Take structure fire PPE, SCBAs and drinking water into the cab

- Be prepared to move the vehicle to the safety zone as conditions permit

- Notify supervisor that vehicle is being used as a temporary refuge area as appropriate
TEMPORARY REFUGE AREA STRUCTURE

• When determining whether or not to use a structure as a temporary refuge area, consider:
  – Fire behavior, intensity, and rate of spread
  – Flammable construction features
  – Vegetation clearance around the structure
TEMPORARY REFUGE AREA STRUCTURE

- Fuel type (grass vs. heavy fuels) and loading
- Expected duration of exposure to heat and direct flame impingement
- Proximity to topographic features (chimneys, drainages, slopes, ridges)
TEMPORARY REFUGE AREA STRUCTURE

• To prepare a structure for use as a temporary refuge area, firefighters should:
  – Close all windows and doors
  – Remove flammable materials from windows
  – Close heavy drapes
  – Turn on all lights, even during the daytime
  – Apply a Class A foam or gel on the structure’s exterior (time permitting)
TEMPORARY REFUGE AREA STRUCTURE

- Fire around the structure (if appropriate)
- Deploy hose lines and garden hoses through openings on the least involved side of the structure
- Take structure fire PPE, SCBAs, and drinking water into the structure
- Enter the structure and move to the furthest point from the fire
- Identify alternate exits
- Notify supervisor that structure is being used as a temporary refuge area
Deployment Site
BODIES OF WATER

• In extreme situations bodies of water can be used as Deployment Site including:
  – Swimming pools
  – Lakes
  – Ponds
  – Rivers
  – Streams
  – Large wet boggy areas

• This should be considered a last resort
Not Threatened - Safety Zones and TRA’s are present and construction features or defensible space make it *unlikely* that the structure will ignite during initial fire front impact.
Threatened Defensible - Safety Zones and TRA are present and construction features, lack of defensible space, or other challenges require firefighters to implement structure defense tactics during fire front impact.
Threatened Non Defensible- No safety Zones or TRA’s are present. Structure has challenges that do not allow firefighters to commit to stay and protect the structure.
FACTORS TO CONSIDER FOR ALL 3 TRIAGE CATEGORIES

- Fire Behavior at time of fire front impact to structure
- Skills, knowledge and abilities of crew
- Other assets and lives at risk in area – Risk vs. gain
- A structure’s ability to withstand fire – short term or long term
- Safety Zones, Escape Routes and TRA’s
Use the Survival FACTS (S-FACTS) acronym to assure safe structure triage actions.

- **Survival** - Initial Assessment - Can you survive here? If not leave now!
  - Is there a Safety Zone nearby? Is there a viable escape route?
  - What is the decision point at which resources should leave based on current fire behavior
  - Is there a Temporary Refuge Area present on site?
**S** – SURVIVAL

- Is the *Prep and Go* tactic an option?
  *A tactic where minimal prep actions are taken before leaving the structure to return after the fire front passes*

- Do you have communication with your supervisor and adjoining forces?

- If safety issues cannot be mitigated, **LEAVE NOW!**
STRUCTURE TRIAGE DECISION PROCESS - SURVIVAL FACTS

**F**-Fire Behavior/Fire Environment -

- Can you survive based on current and forecasted fire behavior? If not, **LEAVE NOW**!

- Watch for extreme Fire Behavior Indicators:
  - Spotting, sustained crown runs, sheeting, extreme rates of spread
STRUCTURE TRIAGE DECISION PROCESS - SURVIVAL FACTS

• **F**-Fire Behavior/Fire Environment
  – Can you survive based on current and expected fire behavior?
  – Look up, Look Down, Look Around Indicators:
    – Fuels- Fire intensity on impact how long will it take to consume the fuels? Flame Length and Height?
    – Wind- Current speed and direction. Are wind shifts expected?
    – Terrain- Are you In a chute, chimney or saddle? If so, **LEAVE NOW**! Is wind and slope in alignment? What is your position relative to topography. Mid slope or on top of a ridge?
• **F**-Fire Behavior/Fire Environment (cont.)
  – Atmospheric stability – Do you see clear skies, dust devils, towering smoke columns, or feel gusty winds? **UNSTABLE ATMOSPHERE**
  – Do you see hazy skies with no dust devils or detect only a light steady breeze? **STABLE ATMOSPHERE**
  – Fire behavior requires constant monitoring
STRUCTURE TRIAGE DECISION
PROCESS- SURVIVAL FACTS

• **F**-Fire Behavior/Fire Environment (cont.)
• Other weather considerations
  – Are you monitoring the current RH?
  – Do you expect changes in the RH as the day goes on?
  – Are thunderstorms forecasted for the fire area? If so WATCH FOR ERRATIC UPDRAFTS AND DOWN DRAFTS.
STRUCTURE TRIAGE DECISION PROCESS- SURVIVAL FACTS

- **A-Access** - Is ingress/egress compatible with time and distance factors necessary to utilize an escape route to safety zone?
  - Are road surfaces adequate for required speeds?
  - Adequate road width?
  - Are there turnaround/turnouts?
  - Are bridges within limits for fire apparatus? Culverts? Drainage ditches?
  - Steep Grades?
  - Is there a safe place to spot the apparatus?
STRUCTURE TRIAGE DECISION PROCESS- SURVIVAL FACTS

• C- Clearance/Construction- Is clearance and defensible space adequate based on current and expected fire behavior?
  – Is defensible space adequate based on terrain and fuels? Can it be mitigated quickly?
  – Will building materials and yard clutter compromise safety and success? Are there hazardous materials present?
  – Is the construction wood siding, or shake / shingle roof?
STRUCTURE TRIAGE DECISION PROCESS- SURVIVAL FACTS

• Are there attic vent openings, large windows facing the fire front or decks with vegetation below? Will ember intrusion be a problem?
  – What are the contents of the garage and outbuildings?
  – Are there propane tanks, fuel tanks, power lines?
  – Is there an adequate water supply onsite?
  – Are additional resources needed?
  – Consider *Prep and Go or *Prep and Defend tactics

  *A tactic where resources are able to stay at a structure when the fire front arrives
**STRUCTURE TRIAGE DECISION PROCESS - SURVIVAL FACTS**

- **T-Time Constraints** - Is there time for an adequate size up of the structure defense problem?
  - Is there time to mitigate safety concerns?
  - Is there time and resources necessary to properly prepare the structure for defense?
  - Is there time to escape via an escape route and make it to a Safety Zone? If not, **LEAVE NOW!**
• **S**- Stay or Go?
  – Tactical Decision based on **S-FACTS** criteria
  – Is it safe to stay? If no, **LEAVE NOW** or utilize the
    *Check and Go* tactic.
    * A tactic used when LCES cannot be maintained, a
      quick check for occupants then leave the area
  – Is there time to prepare the structure for defense, what
    will the fire behavior be when it impacts the structure?
  – Use **Prep and Go** or **Fire Front Following** when it is
    not safe to **Prep and Defend**
    **A tactic where resources follow the active fire front taking appropriate action**
Evacuations
Evacuations

• The authority to order a planned evacuation resides with the Law Enforcement (LE) Agency having jurisdiction
  – Suppression personnel should be prepared to assist or initiate evacuations to save a life when LE is not available

• Utilize LE or Evacuation Branch or Group to insure coordination in planning, communication, and execution of evacuation operations
Evacuations

• The 2012 FIRESCOPE *Field Operations Guide* (FOG) lists six protective actions
  – Evacuation warning
  – Evacuation order
  – Sheltering in place
  – Rescue
  – Community safe refuge area
  – Survival area
Evacuations

- **Evacuation warning**
  - Alerts citizens of a *potential* threat to life and property from an emergency incident.
  - Puts the area on standby and allows the occupants to prepare for a possible evacuation.

- **Evacuation order**
  - Issued when an *immediate* evacuation is required because of an imminent threat to life and property
Evacuations

• **Sheltering in place**
  – Directing citizens to remain in their current location
  – Should only be used if civilian safety may be assured by remaining where they are
  – Must weigh advantages / disadvantages of evacuating civilians from the threatened area (Based on fire behavior)
  – May also be the only option when there is no time or resources available to conduct an evacuation
Evacuations

- **Rescue**
  - Refers to emergency actions taken within an affected area to recover and remove injured or trapped civilians
Evacuations

- **Community safe refuge area**
  - A temporary, safe location to shelter citizens until either a safe evacuation route is opened, the fire threat is mitigated, or evacuees return to their homes.
  - A local setting where neighborhood citizens may congregate close to their homes such as a school, park, mall or large parking area.
  - May be formalized for specific areas on written plans.
Evacuations

• Survival Area
  – An area deemed a safer alternative to sheltering in place. A survival area should only be used if civilians are unable to make it to a community safe refuge area.
Evacuations

- Keys to successful evacuations:
  - Identify the evacuation area
  - Notify LE early of impending evacuation
  - Establish decision points to initiate the evacuation
  - Make the evacuation decision in a timely manner
Evacuations

- Co Locate ICP with LE Agency having Jurisdiction
- Imbed LE Supervisors with fire line supervisors in the field and ICP
- Utilize Fire Liaison with LE
- Have maps of the affected areas
- Consider LE Mutual Aid
  - Supervision
  - Animal Evacuation Issues
  - Traffic Control/Closures
TRAFFIC CONTROL

• A road block controlling access to an area
• The IC or OSC will identify a *traffic closure level* for all traffic control points based on fire conditions and suppression operations in each area
• **California Penal Code 409.5:** Members of the news media are allowed access under all closure levels unless there is a crime scene or their presence will interfere with firefighting operations
TRAFFIC CLOSURE LEVELS

• **Level 1 – Green**: Allows residents only
• **Level 2 – Yellow**: Restricts all traffic except emergency and critical resources
• **Level 3 – Orange**: Restricts all traffic except fire and LE
• **Level 4 – Red**: Restricts all traffic from entering including fire and LE. Usually Not in effect for long periods of time
Immediate Need Evacuation Checklist

- *This checklist will assist Law Enforcement and Fire Department personnel in the implementation of an Immediate Evacuation Area. It is designed to provide coordination and improve effectiveness in the initial attack phase of an incident.*

- **Immediate Need Evacuation Guidelines**

  - Identify the need for an immediate evacuation area.

  - Determine potential for incident spread and request appropriate resources to complete evacuation and mitigate incident concurrently. (Include Law Enforcement AHJ)

  - Establish an Incident Command Post (ICP); co-locate law enforcement at ICP.

  - Identify evacuation area utilizing Thomas Brothers Map or other appropriate map reference (provide map page reference and grid.) Include area of incident potential when determining evacuation area.

  - Identify traffic control points for entry and exit of resources and civilians.
Immediate Need Evacuation Checklist

- Identify areas that must be immediately evacuated and label “evacuation order” areas.
- Identify areas that are potentially threatened and label “evacuation warning” area.
- Identify “safe refuge” areas inside evacuation areas.
- Determine and publish evacuation routes.
- Divide incident into appropriate divisions of labor and develop incident organization.
Immediate Need Evacuation Checklist

- CONSIDERATIONS – *(as time allows)*
- Requesting Liaison function for Public Notification Systems. (Local OES)
- *Emergency Alert System*
- *Commercial phone/paging/email notification systems (Reverse 911)*
- *Warning Sirens*
- Identify and clearly communicate the Decision Points for implementing additional evacuation areas. Evaluate the evacuation and expand or contract the plan as necessary.
- Identify areas of Special Needs Population and large animals
Developing the Evacuation Plan

- Type of Evacuation or Shelter in Place?
- Area to be Evacuated
- Evacuation Route Considerations
- Where to Send Evacuees?
- How Much Time to Evacuate?
- Safety Issues for Law Enforcement
- Animal Evacuation Issues
- Law Enforcement Branch or Evacuation Group
- Structure Defense Plan
Structure Defense
The best structure defense is to stop or divert the fire before it impacts structures. 

- By using conventional wildland tactics:
  - Anchor and Flank
  - Envelopment
  - Line construction (direct and indirect)
  - Firing operations
  - Hot spotting
  - Extinguishing spot fires
STRUCTURE DEFENSE

• Base all actions on current and forecasted fire behavior
• Take advantages of opportunities to extinguish spot fires, cool hot spots and address perimeter line that is easy and quick to suppress
  – This will contribute to the overall incident effort to defend structures
  – Do not become so focused on perimeter control that the primary mission of structure defense is compromised
Tactical actions are dynamic, always changing as the fire situation changes.

Resources may initially engage the fire using one tactic but change to other tactics as conditions deteriorate or opportunities arise.

Different tactics will be used on different parts of the fire at the same time.

The bottom line is looking ahead and anticipating fuel and terrain changes that will affect fire behavior.
TACTICAL ENGAGEMENT PROCESS - PACE

• For every tactical plan, an alternative or backup plan aimed at achieving the incident objective should be developed.

• In addition there should be a backup safety or emergency plan for incident personnel.
TACTICAL ENGAGEMENT PROCESS - PACE

• Begin structure defense planning by identifying an exit strategy or end state (objectives)
• Build agility and flexibility into the plan, include contingency planning
• The military acronym PACE is an effective tool for developing tactical plans
• PACE should be implemented prior to engaging in any structure defense plan
PACE

- **P** - Primary Plan [Offense]
  - Focused on fire fighter safety
  - Focused on mission objectives
  - Yields the most desirable results

Example: Staffing hose lines to suppress the fire around a structure
A - Alternate Plan [Offense]

- A fall back plan that closely supports the Primary Plan
- The results may be less desirable but still supports the Primary Plan

Example: Retreating into or behind the structure until fire intensity diminishes, pickup up spots, extinguish partially involved structure
PACE

• C - Contingency Plan [Defense]
  – A plan totally focused on the firefighter’s safety
  – Withdraw along the escape route
  – Move into a safety zone
  – Move to a temporary refuge area
PACE

- **E - Emergency Plan [Defense]**
  - A plan totally focused on individual firefighter **survival**
  - When threatened by fire, firefighters should get into their fire shelter

**ALWAYS HAVE A DEPLOYMENT SITE IDENTIFIED!**
STRUCTURE DEFENSE LEVELS OF ENGAGEMENT

- These actions apply to all aspects of WUI firefighting from incident strategy to perimeter control to structure defense.
- They identify a logical approach to choosing the appropriate tactical action.
- **DRAW-D** denotes Levels of Engagement ensuring that every level of engagement is equal in value to the overall effort.
STRUCTURE DEFENSE LEVELS OF ENGAGEMENT

DRAW-D
- Defend
- Reinforce
- Advance
- Withdraw
- Delay
DRAW-D

• **D – Defend**
  Holding actions to protect priority areas and assets at risk, hold and improve control lines and defend structures

• **R – Reinforce**
  Bring in more resources to assist resources already engaged.
  Resources should be added to advance or hold ground.
DRAW-D

• **A – Advance**
  Use aggressive tactics to move forward and gain ground by either direct or indirect attack. Consider limited firing operations to clean up indirect line.

• **W – Withdraw**
  Curtail actions until conditions become more favorable. Abandon positions in response to dangerous fire activity.
D – Delay

Wait in a safe area until the fire can be engaged under more advantageous conditions. Establish decision points to continue to advance and defend. A delaying action is a conscious decision to maximize long term effectiveness.
Appropriate Actions vs. Independent Action… The Difference

- **Independent** action is *Freelancing* without coordination, authority, or supervision. It is inherently unsafe.
- **Appropriate** actions have parameters and restrictions:
  - IC or Operations provide *Leader’s Intent statement*
  - Sets controls/expectations on high risk operations
Appropriate Actions vs. Independent Action... The Difference

- Allows field decisions on tactical actions by *subordinate units* within the leader’s intent statement
  - Defend life and property
  - Triage/defend structures
  - Perimeter control
  - Engage spot fires and hot spots
Structure Defense Tactical Actions
STRUCTURE DEFENSE TACTICAL ACTIONS

• Primary tactical actions:
  – Check and go
  – Prep and go
  – Prep and defend

• Secondary Tactical actions:
  – Fire front following
  – Bump and run
  – Anchor and hold
  – Connect the dots
  – Tactical patrol
Check and Go

- A rapid evaluation to check for occupants at a structure who may require removal or rescue
- Structure triage category: Threatened non defensible
- Extreme fire behavior, compressed time constraints, inadequate defensible space prohibit safe structure defense actions, NO TRA OR SAFETY ZONE
- This tactic may be affected by adverse topography.
- Perform walkaround to quickly assess ability to defend.
- Assess exterior construction features.
- Assess occupant status.
- Assess contents of garage.

Check and Go
• **Prep and Go**
  
  – Some preparation of the structure may be safely completed prior to resources leaving the area
  
  – Structure triage category: Threatened defensible or threatened-non defensible
  
  – NO TRA OR SAFETY ZONES
  
  – Leave before escape routes are compromised
STRUCTURE DEFENSE TACTICAL ACTIONS

- Resources should engage in rapid, prioritized structure defense preparations and gel or foam the structure prior to leaving.
- Prep and Defend may turn into Prep and Go as conditions change.
- Resources should leave with adequate time to utilize escape routes to safety zones.
Prep and Go

- Concentrate on removal of receptive fuels
- Consider deployment times for resources
- Consider use of engines and handcrews working together
- Minimize number of attack lines
- Apparatus must stay mobile
- Keep escape routes open
- Identify TRA's

Fire direction

- Apply foams or gels to structure and surrounding vegetation or fuel
Prep and Defend

- A tactic used when Safety zones, escape routes and TRA’s are present and adequate time exists to safely prepare a structure for defense prior to fire front impact.

- Structure triage category: Non Threatened or Threatened defensible
STRUCTURE DEFENSE TACTICAL ACTIONS

– Personnel will *LIKELY* remain at the structure. Gels/Foams should be applied in advance of fire front impact in case firefighters are forced to retreat to a TRA or a Safety Zone.

– Situational awareness, escape routes and safety zones must be maintained.

– Secondary plans must be in place in the event fire behavior changes adversely.
Use rotary wing air support to identify and suppress spots.

Attack spot fires with attack lines from apparatus.

Attack lines deployed for defensive or offensive attack.

Keep escape routes open.

Identify temporary refuge areas.

Crew support for structure prep and perimeter control.

Utilize dozers from anchor points to build perimeter line.

Aircraft pre-treating ahead of main fire.

Prepare and defend.
• Fire Front Following

  – A defensive tactic utilized as the fire front passes through an area allowing resources to defend structures while staying behind the fire front
  – Typically used under extreme fire conditions when resources can’t work in front of the fire
  – Resources engage in perimeter control, extinguish hot spots and spot fires and search for and assist victims
STRUCTURE DEFENSE TACTICAL ACTIONS

- Resources engage in structure fire control ONLY on partially involved structures (25% involvement)

- Suppress structures producing large amounts of embers that threaten uninvolved structures and wildland fuels

- Utilize class A foams and gels when appropriate to prevent secondary structure ignitions and assist in mop-up.
Fire Front Following
• **Bump and Run**
  - Resources move ahead of the fire front in the *spotting zone* to extinguish spot fires, hot spots and defend structures
  - Defensive tactic when fire front impact is imminent
  - Offensive tactic when resources are steering the fire to an established end point
  - May involve direct attack with hand lines and firing operations.
STRUCTURE DEFENSE TACTICAL ACTIONS

- Resources must remain mobile and able to maneuver quickly leapfrogging from one structure to another.

- Often used when inadequate resources are available to conduct perimeter control or other structure defense tactics.

- Maintain situational awareness and communication with adjoining forces and supervisor to avoid entrapment.
STRUCTURE DEFENSE TACTICAL ACTIONS

– Structure prep is minimal due to compressed time constraints.

– Firefighters must move on when a quick structure knockdown cannot be achieved or structures become fully involved.

– As additional resources arrive, they should be deployed behind the bump and run resources for follow up on perimeter control and structure defense.
• Bump and run actions may be directed to an end point where other resources have prepared control lines
  – Roads
  – Rivers and streams
  – Wet or green meadows
  – Dozer lines
SL 120

Bump and Run

Fixed or rotary wing aircraft in support

Overhead to triage and account for structures

Type III engines to follow flank

Keep access and egress open

Identify temporary refuge areas

Contain spot fires during fire front passage

Look for tactical refuge areas

Take action on structures where success is probable

Take perimeter control actions when possible

Fire direction

Fire impacting structure

Bump and Run
**Anchor and Hold**

- Tactic utilizing control lines and large water streams from fixed water supplies.
- Primary mechanism of fire spread is **STRUCTURE TO STRUCTURE** in common neighborhoods or commercial areas.
- Goal is to defend exposures, stop structure to structure ignitions, reduce ember production, and extinguish structure fires.
STRUCTURE DEFENSE TACTICAL ACTIONS

– Utilizes hose lines and master streams in conjunction with fixed water supplies (hydrants and drafting).

– Tactic should only be used when water supplies are abundant. Amount of lines deployed should be “as needed“ but kept to a minimum.

– Utilize Class A foams and gels as appropriate to assist in mop-up and to prevent secondary ignitions.
Anchor and Hold

- Engine established at water supply
- Fire behavior allows for established fire attack
- Utilize water curtains or master streams to reduce ember production
- Fully involved
- Fire edge at road
- Blackened fire line
- Multiple dry lines to prepare for ember cast
- Primary ignition becomes house to house
- Fire front has been stopped or steered away from additional structures
- Wind direction

- Anchor and Hold
连接点
- 资源应充分利用 perimeter control opportunities
- 连接控制部分（点）的防火 perimeter
- 连接控制的防火线段在一个结构到一个车道或道路，防火线段是连接一个“点”到另一个“点”的基础，这是这个战术的基础
• Sections of the fire perimeter may gradually be connected using a combination of the *connect the dots* tactic along with direct and indirect perimeter line construction.

• Effective tactic to line areas of multiple spots and connect those areas forming a contained perimeter.
STRUCTURE DEFENSE TACTICAL ACTIONS

• Firing operations should be a part of connect the dots to create a *black line when necessary*

• Communication between resources is critical to share intelligence on where the gaps in the perimeter line are located
STRUCTURE DEFENSE TACTICAL ACTIONS

• Tactical Patrol

  – On many incidents, 50-80% of structure loss occurs after the fire front passes and resources move on.

  – Tactical patrol is used when a threat remains to structures after fire front passage due to residual burning, ember cast, and islands of unburned vegetation.
STRUCTURE DEFENSE TACTICAL ACTIONS

- Key element is mobility, situational awareness and continuous monitoring of the assigned area.
- Watch for flare ups and structures threatened from burning wood piles or other debris.
- Watch for secondary ignitions caused from embers in void spaces and roof fires.
- Aggressive mop-up.
STRUCTURE DEFENSE TACTICAL ACTIONS

– Identification and mitigation of hazards such as burned out power poles, down power lines, fire weakened trees, etc. should also be a priority

– Continuously monitor the area while taking *APPROPRIATE ACTION* to defend structures
ICS Organization
ICS Organization for Structure Defense

- **Branches**
  - Functional or Geographic
  - Operations Chief qualified
  - Branch level planning (use of ICS Form 215)
  - Structure Branch disadvantages
    - Planning/Coordination issues with other Branches
    - Who has control of resources and staging?
    - Who is in command when fire hits structures?
  - Geographic Branch structure defense advantages
    - Sharing Structure Group resources w/ Division for perimeter control as needed
    - Control of ALL resources assigned in geographic area
    - Unity of Command
Structure Branch

- Structure Group A
- Structure Group B
- Structure Group D
Structure Branch

- Disadvantages of an assigned Structure Branch
  - Supervises Structure Groups spread geographically throughout the incident
  - Cannot maintain Situational Awareness and communication with multiple geographic Branches simultaneously
  - Not designed to take advantage of opportunities for offensive perimeter control using structure defense assets
    - Develop structure defense plans only
  - Command and Control conflicts with Geographic Branches
  - No unity of command
    - Resources in same geographic area are supervised by different Branch Directors
Geographic Branch

Branch I

- Division A
- Division B
- Structure Group 1
  Located in Division B
Geographic Branch

• Advantages of geographic Branch control of structure defense resources
  – Unity of Command
  – Situational Awareness
  – Integrate perimeter control plan and structure defense plans (CWCG Principle #2)
  – Ability to assign resources as necessary to provide for perimeter control and structure defense
  – Clearly defined command role
ICS Organization

• Divisions
  – Geographic Area
  – Responsible for all tasks within division
  – Assign/Re-Assign resources as needed within Division to perimeter control or structure defense
  – Often over-tasked span of control
    • Create additional Divisions or Functional Groups
  – Can be overloaded by tasks
  – Do not have direct control of structure defense Groups assigned within their Division
ICS Organization

• Groups
  – Functional, task oriented
  – Geographic mobility (not to replace Division), today structure groups are sometimes fixed to a specific community or subdivision
  – Assists with span of control within Division
  – Examples – Rehab, Structure Defense, Dozer, Water Tender, Firing, Foam Application
  – Disadvantages
    • Coordination/Communication within incident organization
    • Who is in charge when fire hits structures? Unity of command
Task Forces

• Utilize Task Forces and Strike Teams for structure defense operations assigned to the Division Supervisor
• Improves unity of command
• Advantages
  – Assigned to specific geographic branch directors who assign them to divisions within the branch as needed
  – Named after incident and then numbered (example, Jesusita Task Force 1)
Task Forces

– Assembled for the precise structure defense problem, not limited to the same kind and type of resource

– Division supervisor now has direct supervision of the task force when assigned to the division

– Task force may be used for structure defense or perimeter control by the division supervisor
Task Forces

– Units from the task force can augment perimeter control resources

– Perimeter control resources can augment the task force assigned to structure defense

– Released back to the branch director when the task is completed
Structure Defense Task Force

Division Supervisor

Structure Defense Task Force (4 engines, 1 Tactical WT, 1 Crew)

Strike Team Engines (Perimeter Control)

Strike Team Crews (Perimeter Control)
Structure Defense Groups

- Created to assist the Division or Branch with span of control of multiple strike teams or task forces
- When structure defense planning and preparation issues are too complex for the division to adequately supervise both structure defense and perimeter control
- Mobile, able to move from Division to Division as necessary
- Naming convention is same as Task Forces (Example, Cedar Structure Group 1)
Perimeter Control

• At any point on a WUI fire, resources must be prepared to initiate perimeter control actions
  – Initiate an offensive attack
  – Use direct attack strategies
  – Take advantage of lulls in fire intensity
  – Do not abandon structure defense actions but work in congress with perimeter control resources
References

- IRPG
- FIRESCOPE Field Operations Guide (FOG) Chapters 14 and 20
- CAL FIRE WUI Operations Handbook
- SFM Command 1C
- NWCG Entrapment Avoidance, S-336 Tactics and Strategy
- CAL FIRE Academy