B. Strategy and Tactics

General Background: Strategy and Tactics

Managing an emergency incident effectively requires an Incident Commander to have a sense of the size and scope of an incident, the capabilities of personnel on scene, and resources available. Additionally, the Incident Commander must determine an overall strategy for addressing the incident and communicate the strategy to other crews on the scene. An incident strategy includes a goal, or set of goals, for managing the incident hazard.[12] Often, these goals are articulated in an Incident Action Plan (IAP) and used to frame operational tactics. While strategy outlines the broad goals for managing an incident, tactics refer to how resources are used to accomplish those goals. In the context of firefighting, tactics are actions such as managing ventilation within a structure with active fire.

Borrowing from military doctrine, there are two philosophies for Incident Command to convey strategy and tactics. These philosophies can be expressed by the German terms Befehlstaktik (command-driven tactics) and Auftragstaktik (mission-based tactics).[13] Befehlstaktik is a centralized command and control structure in which the command chain prescribes why, when, and how operations will be conducted. For example, the Blue Card Hazard Zone Management System employs a command and control structure. Under this system, tactical and operational decisions flow through the Incident Commander down to personnel on the fireground.

Auftragstaktik is less regimented, with the Incident Commander providing instruction on the "why" and "when" of operations but delegates "how" operations are executed to lower level leaders. This command philosophy is often employed by the United States Marine Corps, with commanders providing their crew a mission but trusting those crews to determine the best tactics to complete their assigned mission. In the fire service, an example of Auftragstaktik philosophy would be an Incident Commander assigning a crew to "Fire Attack," with the "why" being an assignment to extinguish the fire and the "when" being the time of assignment. The supervisor for Fire Attack would then have the authority to determine the best operation and tactics to extinguish the fire with the crews they have. This philosophy of command is supported by organizational Standard Operating Procedures or General Orders.

Response organizations must establish a clear and consistent command philosophy so that personnel know what to expect during response operations. This philosophy should be present throughout organizational planning, training and operations. Consistent organizational command philosophy supplies lower level personnel a commander's intent when given orders, enabling them to effectively follow command without foreknowledge of an individual commander.

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[12] NATIONAL FIRE PROTECTION ASSOCIATION, STANDARD ON EMERGENCY SERVICES INCIDENT MANAGEMENT SYSTEM AND COMMAND SAFETY 1561 (2014).

[13] Geoffrey Sloan, Military Doctrine, Command Philosophy and the Generation of Fighting Power: Genesis and Theory, 88 INT'L AFF. 243-263 (2012).

Policies and Standards Applicable to Howard County Department of Fire and Rescue Services: Strategy and Tactics

HCDFRS General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines outlines the responsibilities an Incident Commander and company officers have during fire incidents involving Single Family and Townhouse structures. Portions of this order relevant to this incident include, the two strategies HCDFRS uses in approaching a residential structure fire: offensive and defensive. Additionally, this order assigns the first arriving engine company the responsibility to establish a water supply plan. Under this order, the first arriving engine company is to, "[m]ake provisions for water supply by laying supply line and communicating the address of the layout, or split lay…." The second arriving engine is, "to ensure the water supply for the first arriving engine company," unless ordered otherwise.

Another order pertinent to this incident is HCDFRS General Order 300.07 Incident Command System, which outlines HCDFRS' adoption of the National Incident Management System (NIMS) as outlined by the United States Fire Administration/National Fire Academy Field Operations Guide. This General Order describes three Command Modes in HCDFRS: Investigation, Tactical, and Strategic. Investigation Command may be established when the first arriving officer cannot identify a Hazard Zone and has the Incident Commander on-foot to investigate the potential hazard. It is in this mode that the Incident Commander is to transmit a Size-Up Report. Tactical Command Mode requires the Incident Commander to establish the overall incident strategy, establish objectives, evaluate the need for additional resources, as well as direct and assign responding resources upon arrival while the Incident Commander is operating on-foot and from within the tactical environment. Strategic Command Mode requires the Incident Commander to establish the overall incident strategy, establish objectives, evaluate the need for additional resources, as well as direct and assign responding resources upon arrival while the Incident Commander is operating from a command post outside of the tactical environment.

Woodscape Drive Incident Overview: Strategy and Tactics

The first unit on the scene of 7005 Woodscape Drive was Engine 51, with Engine 51A assuming the role of Incident Commander as the first arriving officer. Engine 51 did not make provisions for water supply or communicate a water supply plan en route or on arrival. Engine 51A assessed the situation and transmitted the Initial Radio Report at 02:00:29 hours, stating, "51 to Howard single family two story, smoke showing, go ahead and start a box." As the Incident Commander, Engine 51A then directed Tower 10 to the front of the structure and started a full box alarm.

Battalion Chief 1, piloting a newer version of the map on his MDT than was on Engine 51's MDT, identified a pool at the rear of the property. While in transit, Battalion Chief 1 directed Engine 51 to reposition to the rear of the property to see if they were able to use the swimming pool as a water supply because there were no hydrants on Woodscape Drive. The second arriving engine, Engine 101, did not ensure the water supply of Engine 51. Engine 101D, understanding there was a hydrant on Guilford Road, repositioned Engine 101 with the intention to reverse lay from Engine 51 toward the hydrant.

Engine 51 repositioned to the upper level of Side C, deploying a $1^{3/4}$ -inch diameter, 200-foot line. Engine 51 advised Command of their position on Side C and that the homeowner advised of heavy smoke in the basement. At that time, Engine 51 entered the structure on Side C on the upper level but did not relay the conditions to Battalion Chief 1.

Battalion Chief 1 arrived on the fireground and radioed that he was assuming Command and committing to an offensive strategy at 02:03:55. The Incident Commander then assigned Engine 51 and Tower 10 to the Fire Attack Group with Engine 51A as the Fire Attack Group Supervisor. The Incident Commander then inquired about the status of the water supply from the pool. The Incident Commander also requested a "visible report" from Side C from the basement as soon as possible. At that point, the Battalion Aide began a 360-degree assessment of the incident scene in order to report to the Incident Commander. Reporting back to the Incident Commander, the Battalion Aide stated that the structure had two stories

Figure 17: Photograph or Floor 1 entrance 21 minutes after MAYDAY

on Side C with a glass slider for access to the finished basement. The Battalion Aide also stated that there was smoke visible. At 02:07:06, Tower 10D advised the Incident Commander that there was smoke at the ground level at Side A. At approximately the same time, Engine 51B was inside the structure and saw indications of a basement fire on his thermal imaging camera, although they did not relay their findings to the Incident Commander. After that observation, Engine 51 and Tower 10's crews exited the upper level of Side C to redeploy to the lower level of Side C. In doing so, Engine 51A radioed Command stating that they needed to re-examine access through the basement slider. Engine 51B then redeployed the 200-foot line to the lower level of Side C, quickly finding that it was not long enough. At the same time FF Flynn (Engine 101B) deployed a $1^{3/4}$ -inch 300-foot line to the lower level of Side C, making entry with Tower 10A and Tower 10B approximately four (4) feet into the basement.

At 02:09:27 Engine 71A radioed Command of their impending arrival to see if they were needed on scene or to acquire a secondary water supply. Command instructed Engine 71A to bring secondary water from a neighboring street. At 02:12:41 hours Command notified all units that all three occupants had exited the structure, there was no change in operational posture from Command at that time.

At 02:15:30 Engine 51 and Tower 10 advised that they were unable to find the fire. Engine 101A relayed to Command "we have heavy fire on floor number one, Side Charlie" at 02:15:48 hours. In response to Engine 101A, the Incident Commander asked whether it was possible to "hit the fire from the exterior." Engine 101A replied "we need to redeploy our lines back up to the initial entrance," referring to the upper level of Side C although that was not clear to the Incident Commander.

Figure 18: Photograph of hydraulic pump supplying Engine 51

During the communication between Engine 101A and Command there was uncertainty as to Engine 101's position, with the Incident Commander asking for Engine 101A to confirm their location at 02:17:16. Tower 10A responded to Command's clarification request, stating that Engine 101 and Engine 51 were making entry in Quadrant 2 with crews having made access to the basement, experiencing smoke conditions, and closing the basement door to restrict airflow. Tower 10A advised that the, "only crews you should have in are on first level, entering Side Charlie." At 02:18:29 the Incident Commander directed Truck 7 to assume RIC duty and that they have Engine 51, Engine 101 and Tower 10 entered on Side C.

At 02:20:11 Engine 101A declared MAYDAY, although it was unclear to Command whether it was Engine 101A or Engine 101B experiencing a MAYDAY emergency. After clarifying with the Communications Center and Engine 51A, the Incident Commander determined that FF Flynn was experiencing a MAYDAY emergency at 02:24:16.

Figure 19 Aerial view of 7005 Woodscape Drive with the location of apparatus

Findings and Recommendations: Strategy and Tactics

The most critical decision during the 7005 Woodscape Drive incident that contributed to FF Flynn's death was the tactical choice for crews to enter a structure above a fire. A confluence of factors lead to this tactical error, which are explored in this section. While the ISRB analyzes the shortcomings of the strategies and tactics employed during this incident, the goal of this assessment is to improve future HCDFRS operations and not to assign blame or responsibility.

First, it is difficult for an Incident Commander to convey strategies and tactics of an incident clearly without a clear philosophy of command. The standards required for establishing strategy and tactics under General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines blend command philosophies, possibly contributing to the confusion between Incident Command and crews operating within the Hazard Zone. For example, the Incident Commander (Battalion Chief 1) employed a Befehlstaktik (command-driven tactics) philosophy while establishing water supply because he provided explicit tactical direction in using the residential pool as a water source and ordering Engine 71 to not commence in Fire Attack on Side A. However, the Incident Commander employed the Auftragstatik philosophy (mission-based tactics) when he assigned Engine 51 and Tower 10 to the Fire Attack group with Engine 51A as the Fire Attack Group Supervisor. In this instance, the Fire Attack Group was given a broad mission (find and extinguish the fire) without explicit tactical instruction from the Incident Commander on how to do so. This blending of command philosophies leads to uncertainty among crews, making it unclear what tactical choices are to be made by the Incident Commander and which choices crews are empowered to make themselves. Additionally, this blended philosophy makes it more difficult for all personnel to understand the implications of the tactical choices they do make. Clearly choosing a command philosophy and integrating that philosophy into HCDFRS General Orders and training will enhance HCDFRS' ability to develop effective strategies and tactics to manage an incident.

In considering which philosophy HCDFRS should employ, the ISRB noted that the command-based philosophy creates an information bottleneck and delays tactical decision making during operations. This is because the Incident Commander only has the bandwidth to communicate one decision at a time, meaning that all operational decisions must be made sequentially rather than allowing for multiple decisions and tactics to be deployed at the same time. This was shown during this incident where the Incident Commander's decision making was diverted to establishing water supply, delaying his ability to provide tactical direction to the Fire Attack Group Supervisor.

The ISRB recommends that HCDFRS adopt a mission-based philosophy throughout the department. By adopting a mission-based philosophy, HCDFRS officers should ground their directions to their crews on the Incident Commander's intent, clearly communicate that intent when needed, all while empowering unit officers to make prudent, tactical decisions to accomplish their assigned missions. To be effective, HCDFRS must improve the trust between crews, their officers, and Incident Commander. HCDFRS must also facilitate the creation of cohesive teams that are able to work together with a shared understanding of the parameters of

their given mission and exercise disciplined initiative. In adopting this philosophy, HCDFRS training should prepare personnel for a process for identifying risk on the fireground and accepting prudent risks in order to accomplish their mission.

Second, group supervisors and unit officers failed to give proper direction and orders on the fireground. This was true regardless of the command philosophy employed during the incident. For example, Engine 101A transmitted to Incident Command that "we are two-out, Side Charlie" and functioned as a back up to Engine 51. Notably, the Incident Commander never explicitly assigned Engine 101 to the Fire Attack Group but provided commands to Engine 101 as if they were part of the Fire Attack Group. As part of the Fire Attack Group, the Fire Attack Group Supervisor (Engine 51A) did not provide clear direction to the group and Engine 101A did not request redeployment of the line through the Fire Attack Group Supervisor. Rather Engine 101A announced the redeployment of the line directly to the Incident Commander.

Additionally, when Engine 111A ordered Engine 111B to "find something to do" on the fireground while Engine 111A remained at the hydrant with Engine 111D (an action detailed further in Section H. Crew Integrity of this report) the order lacked either a mission under the Aftragstatik philosophy or a clear order under Befehlstaktik (command-driven) philosophy.

Third, although the Incident Commander established a strategy for the incident according to HCDFRS policy, the strategy for the incident was announced before the Incident Commander established a clear mental model of the incident. The declared strategy set the tone for the overall incident, before they were able to absorb and orient themselves to the unique factors of the structure at 7005 Woodscape Drive. The declared strategy of this incident was an offensive posture (entering the building). The ISRB believes that it was in the Incident Commander's mental model that this strategy was established to extinguish a basement fire. However, the Incident Commander did not expressly communicate this understanding to crews on the fireground. Additionally, the Incident Commander's strategic command was not sufficiently tailored to the unique circumstances of this incident. For example, despite the massive size of the structure the Incident Commander made a general assignment of Fire Attack, which covered the entire 8,400 square foot structure, rather than providing a clear geographic boundary for Fire Attack. Rather than assigning groups, the Incident Commander should have assigned crews to geographic locations, such as a Basement Division, would have focused crews on the Basement Level.

Fourth, the strategies and tactics deployed during this incident were hindered by a lack of cohesiveness among the crews. There is evidence, almost from the beginning, that Engine 51 was not a cohesive team. The team made their initial entry without Engine 51A. While it is true that Engine 51A was bound by HCDFRS General Orders to remain on the exterior there is no evidence that he provided the team with any direction upon their entry and there is no evidence that he provided any sort of overwatch function, either as Incident Commander or in his later role as Fire Attack Group Supervisor. Additionally, the crews failed to communicate the conditions, actions, and needs (CAN) they encountered on the first floor to the Incident

Commander. Current CAN reports do not necessarily provide the Incident Commander information regarding a firefighter's location. In this incident, the location of a firefighter along with the grade of Side C may have aided the Incident Commander in understanding where all crews were operating during the incident. Based on interviews with those crews, smoke conditions and observations on TICs indicated a basement fire. Despite indications of a basement fire, those crews did not reposition until Tower 10A ordered them to exit the structure and redeploy to the basement.

Another example of this hindrance is the failure for the first two arriving engines to establish water supply, which had an outsized effect on subsequent incident strategy and tactics. Under General Order 310.01 Single Family and Townhouse Structure Fire Operational Guidelines the first arriving engine is to lay supply lines and communicate the address of the layout to other responding units. The second arriving engine is to then, "ensure the water supply of the first arriving engine company." Neither action occurred at the outset of this incident. Engine 51, as the first arriving engine, did not make provisions for water supply or communicate a water supply plan en route or on arrival. Additionally, although Engine 101 repositioned with the intention to reverse lay from Engine 51 to a hydrant on Guilford Road, Engine 101 did not ensure water supply as the second arriving engine. This failure limited tactical options on the fireground not only due to the delay in establishing a water supply but because it pulled the fourth due engine (Engine 111) away from RIC duties to establish water supply. Beyond that, addressing the critical need to establish a water supply plan diverted the Incident Commander's attention.

Fifth, based on the situational cues crews should have known that the fire was in the basement. In establishing situational awareness, crews must first perceive the situational cues, ascribe the correct meaning to those situational cues, and predict future outcomes based on those cues. The process of perceiving situational cues and ascribing them the correct meaning is sensemaking. During this incident, there were clear situational cues that there was a basement fire: the resident caller indicated smoke in the basement, smoke conditions on the first floor of Side A with moderate smoke on the ground level, and Engine 51 and Tower 10's observations from their TICs that indicated fire in the basement. The ISRB believes that some crews operating on the fireground appropriately ascribed the meaning of these cues—such as Tower 10A when he ordered crews to reposition from the first floor to the basement—however, it is not clear that all crews appropriately identified these factors as indications of a basement fire.

Sixth, the crew's tactical decision-making ability was hampered by the stress and frustration caused by their difficulty in locating the fire. At the fifteen (15) minute mark of the incident, the crews still had not confirmed where the fire was located. Despite the situational cues of the fire being in the basement, the prior tactical decision by Tower 10A to search for fire in the basement, and Engine 51A's request for a PPV fan to locate the fire; at the observation of fire on the first floor the crews rapidly and illogically redeployed to the first floor. This tactical error, to the best of the ISRB's assessment, was likely due to the crew's singular focus on finding the fire. Tower 10D seeing fire on the first floor and communicating the location to Engine 101A over-

rode their sensemaking of the situational cues that there was a basement fire in favor of moving to the area where fire was visualized. Engine 101A's transmission of "we need to redeploy our line back up to the initial entrance" altered the crews course of action to extinguish the fire. This choice to enter at the upper level of Side C rather than continuing entry into the basement resulted in crews entering above a fire that likely burned for close to an hour, with the unfortunate outcome being FF Flynn falling from the upper level of Side C into the crawlspace that contained the fire.

Seventh, crews' failure to report critical information to the Incident Commander and other crews hindered the overall strategy and tactics employed during the incident. For example, crews of Engine 51 and Tower 10 entered the first floor of the structure at approximately 02:07:51 and, using Thermal Imaging Cameras, saw indications of fire beneath them. With that information, they altered tactics to enter the structure at the lower level of Side C, presumably because they thought the fire was in the basement. This highly pertinent information—initial entry to the structure, conditions within the structure, and subsequent exit and repositioning to a lower grade entrance to the building—was never relayed to the Incident Commander or communicated to all crews operating along Side C. At that point, the officers of those companies (Engine 51A, Engine 101A, and Tower 10A) had clear indications that the fire was beneath them.

Eighth, Engine 101 made entry into the first level into the Hazard Zone without expressed authorization from Command, in contradiction to General Order 300.07 Incident Command. General Order 300.07 Incident Command states that, "[c]rews must be well disciplined and not make entry into an interior Hazard Zone until assigned to do so by Command, understanding that operating in offensive overall incident Strategy may not mean that Command is employing interior attack tactics at the moment," the crews made entry without express authorization from Command. Based on the radio transcripts, the Incident Commander was still trying to establish the exact location and nature of crews along Side C before Engine 101 made entry. Following Engine 101A's transmission that they had, "heavy fire on floor number one, on the Charlie Side," the Incident Commander inquired whether they could, "hit the fire from the exterior?" In response, Engine 101A informed the Incident Commander that they needed to redeploy, "back up to the initial entrance" without clarifying whether Engine 101 would be entering the building.

Ninth, this incident was dispatched as a Metro Box, although 7005 Woodscape Drive is along a street without fire hydrants. Current HCDFRS dispatch policy does not have a clear definition of whether an alarm is dispatched as a hydrant box (metro) or non-hydrant box (rural), making the development of a water supply plan more difficult for responding personnel. Moving forward, HCDFRS needs to modify this policy of what qualifies as a metro box or rural box based on clear distance from a water source to the incident site.

Last, during and after the MAYDAY emergency, crews not involved in the RIC efforts did not continue activities to locate, confine, and extinguish the fire. There were immediate efforts to rescue FF Flynn after the MAYDAY emergency, however there were no tactical orders targeted at

locating and extinguishing the fire until after RIC operations were completed. As further explained in Section F. Rapid Intervention Crew, there was no attempt to extinguish the fire in the crawlspace from above. Although there were crews and a charged hose line available to continue locating and extinguishing the fire had they been assigned, there was no such command given.

Findings	**Recommendations**
B.1 HCDFRS does not have a clear philosophy of command, which limits an Incident Commander's effectiveness in executing strategies and tactics.	B.1.1. HCDFRS must clarify its philosophy of Incident Command, with a recommendation for adopting a mission-based expression of strategy where lower level officers (unit officers) are empowered to make tactical decisions to carry out the overall incident strategy. This philosophy of Command should then be reflected in all General Orders and supported by training. B.1.2. General Order 310.01:*Single Family Townhome and Structure Fire Operational Guidelines* must be revised to more clearly articulate strategy employed on the fireground, modernizing the current binary "offensive"/"defensive" strategy to more dynamic strategy declarations.
B.2 Group supervisors and unit officers failed to give proper direction and orders on the fireground.	See Recommendations B.1.1 and B.1.2.
B.3 The Incident Commander established a strategy for the incident according to HCDFRS policy, but that strategy was announced before the Incident Commander established a clear mental model of the incident.	B.3.1. The Incident Commander should complete a 360-degree survey and situational assessment of the fireground before declaring a strategy.

Findings	Recommendations
B.4 Strategies and tactics deployed during this incident were hindered by a lack of cohesiveness among the crews.	B.4.1. HCDFRS must implement hands-on, competency-based training in realistic conditions that reinforces fundamental skills and teamwork necessary for success on the fireground.
B.5 Based on the situational cues crews should have known that the fire was in the basement.	See Recommendation B.4.1.
B.6 Tactical decision making by crews on the fireground was compromised by their frustration to locate the fire.	See Recommendation B.4.1.
B.7 Crews failed to report critical information to the Incident Commander and other crews on the fireground, hindering overall strategy and tactics used during the incident.	B.7.1. HCDFRS leadership must hold crews accountable for failing to execute actions dictated by the General Order without informing the Incident Commander. B.7.2. HCDFRS must integrate reporting of location into existing CAN reports (LCAN).
B.8 Engine 101 made entry into the first level into the Hazard Zone without express authorization from Command	See Recommendations B.7.1 and B.7.2.
B.9 This incident was dispatched as a Metro Box, although 7005 Woodscape Drive is along a street without fire hydrants.	B.9.1. HCDFRS must modify this policy of what qualifies as a metro box or rural box based on clear distance from a water source to the incident site.
B.10 During and after the MAYDAY emergency, crews not involved in the RIC efforts did not continue activities to locate, confine, and extinguish the fire.	B.10.1. HCDFRS personnel must be trained to: • Complete a rescue attempt from an upper level floor. • Continue suppression efforts while RIC operations are underway. B.10.2. Incident Commanders must be trained on managing RIC operations. B.10.3. Crews should continue to use restraint in ventilating structures.