**Tank Wrecks**  
A Breakdown of the Strategical Elements of Difficulty

This is an essay about the elements that compose the strategical component of Tank Wreck’s difficulty. These elements are separated in a list, broken down and explained individually. Furthermore, the essay is closed with an addendum explaining how these elements combine together, contributing to the overall experience and challenge of the game.

1. We must firstly analyze the use of *strategic awareness* in playing, surviving and thriving in games, before we analyze Tank Wreck’s case in particular.  
   1. Firstly, it would be interesting to understand the meaning behind the words *strategic* and *awareness*. We will be using the Cambridge Dictionary to define these terms, and will further elaborate on them based on our context, which is the game’s play.  
      1. Our first word is *strategy*. It is defined as *“a detailed plan for achieving success in situations such as war, politics, business, industry, or sports, or the skill of planning for such situations”*. It is also alternatively defined as *“a way of doing something or dealing with something”*. These definitions both imply that strategy is a set of planned, logical actions taken with the intent of achieving success. We can assume all players, whether consciously or not, has an internal strategy for playing the game and successfully. Some strategies are superior, while others are inferior; relating to their success in achieving the goal of surviving in the game.
      2. Our second word is *awareness*. It is defined as *“knowledge and understanding of a particular activity, subject, etc.”*. Relating to our context, it would be the knowledge and understanding of the multiple and interconnected components of the game; whether that is the enemy’s position, the player’s available ammunition, powerup availability and location, current movement and positioning, etc. Knowledge of these metrics is not useful in and of itself, but planning according to such information is extremely useful.
   2. Secondly, it is important to understand the underlying connection between these two words. Strategy integrates a planned set of actions, which is built utilizing information. In our case, awareness serves as a constant inflow of information which can be filtered and utilized to build this plan. Therefore, in our context, *strategical awareness* is the way the player builds a plan for success, utilizing the information acquired through his awareness – his knowledge of the ongoing events and factors in the game.
   3. We must lastly, then, analyze the impact of depriving and overwhelming the player of information, and the impact that has on his strategy for playing the game.  
      1. Awareness is the player’s ability to perceive and collect the information available to it. This ability has its limits. Providing the player with an overwhelming amount of information means he will either fail to process and plan with this information in time, or he will simply not be able to divide his attention enough to collect this information in the first place. This will, of course, lead to the development of strategies that are context-incomplete, and thus deficient. A player may form a strategy to escape a group of enemies, but if he is not aware that his escape route is being blocked, he may fail. We can therefore conclude that the game’s difficulty is directly proportional to the amount of information displayed to the player, so long as the information amount stays below the overwhelming threshold, and furthermore, the signal to noise ratio of said information.
      2. Conversely, a player with too much information, or one that is faced with an exacerbated signal to noise ratio will find the game boring or too easy. As a result, we must carefully estimate not only the proper amount of information to relinquish to the player, but also the signal to noise ratio of said information.
      3. Further elaborating on this topic, we should also analyze impacts of the mental “processing speed” of the player. Even if the player is capable of harnessing all the information sent to him, he must analyze and form a plan with said information. This process during a match, occurs in real time, and the player’s strategy constantly changes as new situations and challenges arise. Consequently, we must also analyze how long said information takes to be integrated into strategy, and the portion of attention this will require of the player. This issue can essentially be broken down into three factors: Choice Complexity, Choice Frequency and Time. What is the complexity of the choice? How often does the player need to reevaluate his choice (strategy)? How long does he have to do so?  
           
         Moreover, it is also interesting to analyze the impact signal to noise ratio has on player choice (strategy formation) time. Sifting through information and filtering it for useful, actionable knowledge is mentally-expensive and attention demanding, and it is also slow. Consequently, we must take signal to ratio, in specific, with extra care when evaluating and designing the difficulty of the game.

1. Now that the underlying components of managing strategy have been investigated and broken down, we can move on to how they apply on Tank Wrecks and the gameplay loop presented in the game.  
   1. Tank Wreck’s difficulty stems from managing simultaneously three key factors; Resource Management, Positioning and Threat Management. Below, we analyze them individually.  
      1. The first of these factors is Resource Management. This encompasses keeping track of ammunition, health, powerups, keeping track of their expenditure, replenishment, where these replenishments are located and whether they are or will soon be available. In Tank Wrecks, powerups and resource replenishers spawn periodically on predetermined points of the map. These points are plentiful, but purposefully distributed near enemy spawns and at vulnerable positions. This meaning it is a risk assessment on whether to pick a powerup at a given moment.  
           
         The player is also, by design, uncapable of carrying too many shells (maximum of 25 at the time of writing), which means he must keep track of how many shells he is spending. Consequently, he must also evaluate whether he should be conservative with shell expenditure or not, as replenishment may not be immediately available or easily reachable. This then ties back to Positioning and Threat Management. Is going to a more vulnerable position to acquire a powerup or replenish resources worth it right now? Is holding back on shells going to cause a bigger problem by not disposing of active threats soon enough?
      2. The second of these factors are Positioning, and it may very well be the most important. The choice of where to be and where to go next is, on most cases, the most complex one at any given moment during the game. Ideally, positioning avoids threats at the present moment and immediate future, while also satisfying the criteria of setting you on a position where it may be easy to collect a powerup on the short term, should it be necessary. Doing this requires acute awareness of where enemies are positioned, where powerups are available and whether enemies are readying fire soon. You also have to, simultaneously, assess your health and ammo, which may impact the risk and reward of your positioning strategy.
      3. The third and final factor is Threat Management. This encompasses keeping track of the enemy tanks on the battlefield, and the threat they pose to you on the immediate, short and medium term (Tank Wrecks is too fast-paced and chance-based for there to be a long-term scale of strategy). This means understanding what enemies are present, their attack patterns, their current positions and fire readiness. It is only possible to avoid enemy fire by managing threats, even if subconsciously.   
           
         It is also important to take into account the availability of information about a set of enemies at any given time. Throughout the waves, it will be difficult to keep track of every aspect of every threat on the battlefield. Consequently, a player must naturally create simplified mental estimates for what enemy tanks may do on the immediate and short term. This allows for threats to be managed even when they are not being directly observed or being devoted attention to.
   2. Therefore, according to the concepts explained above, we can conclude the following:

* *In summary, Tank Wreck’s strategical difficulty is composed of three key factors; Resource Management, Positioning and Threat Management. These factors are interconnected and interdependent, and constantly require attention and thought of the player. The player must utilize of his strategic awareness to form and constantly adapt a strategy to successfully survive the waves.*