HEX ENCOUNTERS

This is Hex Encounters a very simple introductory[1] hex and counter game on modern brigade combat. As such these rules are short. If a rule doesn't make sense, use your military judgment to ignore, change, or come up with a new rule.

~Turns

The game is played in turns representing 1 day, with hexes of 30km. In one turn:[2]

1) Red Attacks with all their pieces.
2) Red Moves with their pieces.
3) Blue Moves with all their pieces.
4) Blue Attacks with their pieces.
5) Detected units are flipped back up.
6) Supply is traced.
   a. Remove cohesion from unsupplied units.
   b. Spend Reinforcement points.

~Units

Each unit is represented by a block. The icon shows the type, the name is the type and size (e.g. Armor Battalion). The numbers below show the unit's movement (how far it can move), combat power (how good it is at fighting), and cohesion (how much damage it can take before being removed).[3] Orange cubes represent loss of cohesion.[4]

~Detection

Units are on blocks. When a unit ends its movement next to an enemy unit, both sides reveal what their units are.[5] Units that remain adjacent at the end of the turn are not flipped back up to their undetected state.

~Moving

Units have movement points (MP) equal to their movement rating. Different terrain requires a different number of MP to move into (a unit with insufficient MP may not move into a hex requiring a larger number than is available). The number of MP is as follows:

Terrain	Movement Points[6]
Road	½
Open	1
Hills/Forest/Urban	2
Hills + Forest	3
River Hexside	Impassible. With collocated Engineers, 4 MP to ferry.

~Attacking

Pick a hex, any adjacent units (or artillery within 2 hexes[7]) may attack all enemy units in that hex (e.g. combat occurs in the attacked hex). Each unit may only attack once per turn, and artillery can never attack on its own.[8] If all units in a hex retreat or are destroyed, the attacking unit(s) may advance one hex into the space they formerly occupied. Players decide how to allocate cohesion losses to their units.[9] To determine combat:

1. Find the ratio of combat power between the attacker and defender and find the matching column on the *Combat Results Table* below (round to nearest ratio).
2. Apply any other column shifts from the Column Shift Table.
3. Each side rolls 1d4[10], and shifts that number of columns in their side's favor.

-Combat Results Table

Ratio[11]	1:4	1:3	1:2	1:1	2:1	3:1	4:1	5:1	6:1	7:1	8+:1
Result	▲♻♻	▲ ♻	▲	▲	☠	☠	♥	♥♻	♥♻	♥ ♻	♥♻♻

▲=Atkr. loses 1 cohesion per dfendr., ♥=Dfendr. loses 1 cohesion per atkr., ☠=Atkr. and Defndr. lose 1 cohesion per enemy unit
♻ = Number of hexes damaged unit must retreat. A unit can choose not to retreat (or to retreat some) and loses 1 cohesion for each ♻ it chooses to ignore.[12] If unit must retreat and cannot retreat to friendly hex it is destroyed.

-Column Shift Table

Factors	Column Shift	Other Effects
Woods or Hills	1 shift for Defender	
Light Urban	2 shifts for Defender	
Heavy Urban	4 shifts for Defender[13]	May ignore 1 ♻
Attacking Across a Bridge	2 shifts for Defender[14]	For each ♻ the Attacker loses 1 cohesion
Per Loss of Cohesion[15]	1 unfavorable shift per	
Attack from 2 or more non-adjacent ♥'s	1 favorable shift	

~Supply

A unit is in supply if it can trace a path on the board back to a road that connects to their side which is not interdicted by an enemy unit's Zone of Control (ZOC). An infantry or armor unit exerts a ZOC 1 hex around them, all other units exert a ZOC within their own hex.[16] Friendly units negate an enemy ZOC in the hex they are in. A line of supply is also interdicted over a river if the last unit to cross the river at that bridge was an enemy unit. A unit in supply at the end of turn may receive reinforcement,[17] a unit out of supply loses 1 cohesion and halves the number of movement points it has.[18]

~Stacking Limit[19]

Certain types of terrain also have a maximum number of units that can be in that hex, called a "stacking limit".[20]

Terrain	Open	Woods or Hills	Woods+Hills / Light Urban	Heavy Urban
Stacking Limit	6 units	8 units	8 units	30 units

[1] This is designed to teach the following: *Classic Hex and Counters Information*: hexographic representation of space, units with Movement-Combat stats (or Movement-Offense-Defense), terrain (affecting movement and combat, and stacking limits), Combat Results Tables and column shifts, Zones of Control (in this case only for supply, but it gets the point across). *Other Information*: simple combined arms maneuver, blocks as hidden information, simple attrition of combat power, simple logistics

[2] This represents the differences between a more clunky doctrine and a more reactive doctrine. This idea is taken from TSR's *Red Storm Rising*.

[3] Cohesion includes not just the number of soldiers and vehicles in a unit, but also morale, fatigue levels, wear and tear, and other intangibles.

[4] This means that it becomes very easy to see how units are being attritted, but 1) some degree of this would be known to the enemy due to SIGINT intercepts, and 2) It's much easier than doing it in a hidden manner with another sheet of units and cubes.

[5] The basis for the size of the areas of reconnaissance (20km for a regular battalion) comes from *Warfighter 2 (Remote)* by Tim Price

[6] This is based on the TRADOC Pamphlet 350-14, September 1994, Heavy Opposing Force (OPFOR) Operation Art Handbook (https://upload.wikimedia.org/wikipedia/commons/8/8d/TRADOC_Pamphlet_350-14_-_Heavy_Opposing_Force%2C_OPFOR_Operational_Art_Handbook_%28September_1994%29.pdf), pg. 58 (3-3), Note the source assumes hard surface roads (reasonable as the roads here are from a modern country with well-developed road infrastructure), and the given numbers are for divisions not brigades, brigades would likely be faster due to their smaller size.

[7] Given the range of artillery from 20-40km (depending on the type of shell), this allows artillery to support an attack from 1 hex away (30km = 1 hex, combat is assumed to occur on a hex side). This might be a slight stretch of artillery's range, but the intention is to allow artillery to function intuitively, and for people to understand how artillery can support units.

[8] Functionally artillery cannot bring the total mass of its fires without an attack going on in the timeframe of 1 day, as enemies will be undetected or unconcentrated thus not presenting enough targets to allow for artillery to have sufficient effect (under attack or attacking the enemy concentrates and returns fire (becomes detectable), presenting juicy targets). This argument is somewhat correct but is also a simplification for the game.

[9] The idea of cohesion losses being randomly applied was also considered as the lower level combat is the more random, but for ease for new players as well as for speed (as random determination requires dice rolling and therefore time), and for the fact that a commander chooses which units to place in the lead of an attack and where they defend, the player gets to choose where cohesion losses fall on their units.

[10] The use of a d4 here leads to some potential variability (+3/-3), though the use of two dice means that this is (approximately) a normal/Gaussian distribution. While some would argue about the accuracy of such variability in combat, I would note that combat is inherently complicated, confusing, and dependent upon a menagerie of different factors that make outcomes imprecise (though not random, combat is probabilistic). Adding in such variability using the d4 system (a 62.5% chance of being inside the bounds of +1/-1, and a 87.5% chance of being inside the bounds of +2/-2), is less unrealistically "swingy" than might be initially presumed. If combat is viewed by the players to be more or less random than presented here change the dice, a d6 has also been tried but was viewed as too random for battalion level operations.

[11] This combat results table is based on the DSTL Force Ratio Risk Table. Available at https://www.professionalwargaming.co.uk/Force%20Ratio%20Table%20with%20Numbers%20v0.1.png. Note that in these rules all attacks are considered to be prepared attacks verses prepared defenses, given the size of units (brigades) and the turn length (1 day), this is close enough.

[12] This allows the representation of a unit screening the enemy while withdrawing (fall back in correspondence to the strength of enemy push) or choosing to stand and fight (in which case you trade casualties for holding your position).

[13] Ignoring the debates around the accuracy of force ratios, generally a successful attack is likely at 3:1 attacker to defender. For urban operations, a ratio of 4-10:1 seems to be sufficient (average of ~7), so 7-3 = 4, thus 4 shifts for the defender in urban terrain (of course one could argue about different types of urban terrain, but at the game's level of abstraction this is ignored for simplicities sake). For some underlying numbers and discussion on force ratios see: http://www.dupuyinstitute.org/blog/2018/04/25/u-s-army-force-ratios/ (2018). Do note the complexity (and low number of datapoints), as outlined in this further article specifically on urban terrain http://www.dupuyinstitute.org/blog/2022/08/11/the-defensive-value-of-urban-terrain/ (2022). Note however that the type of terrain covered by the dataset (from World War II) would in part not account for megacities, ubiquitous modern rebar-concrete, and earthquake-proof buildings, negating some of the applicability and leading me to disagree with the assessment that "Urban terrain does not favor the defender more so than other terrain (rolling or rugged). In fact, it appears less." I instead conclude that it is (at least in game terms) equal, though more correctly I would argue that urban terrain does not provide as strong a defensive bonus as it slows down fighting (however representing this in this game would be difficult, hence the simple column shift). My views on urban combat overall are more complicated but the 4 column shifts and ability to ignore 1 retreat is a good enough approximation of a multitude of complex dynamics.

[14] Lacking information on river crossings I will attempt to extrapolate from amphibious assaults. It is extremely difficult to determine the force ratio difference from 3:1 an amphibious assault requires on average to be successful (*Charting the Pathway to OMFTS: A Historical Assessment of Amphibious Operations From 1941 to the Present*, Carter A. Malkasian, CNA, 2002, pg. 53-59). Given data from the same source (on pgs. 55-56), it seems like past 5:1 the chance of an operational pause lessens dramatically, thus giving us a 2-column shift (3:1 -> 5:1).

[15] While units remain effective in combat even when ground down to a much lower number than classically assumed to make a unit "combat ineffective" (based on of *The Relationship of Battle Damage To Unit Combat Performance*, Leonard Wainstein, 1986, Institute for Defense Analyses.), units do become less and less effective as they take casualties and accumulate the stress and wear of battle.

[16] This represents the area footprint of a unit + the area of reconnaissance of a unit. This is a rather large ZOC to exert for a combat arms unit (e.g. 90 km in diameter), but is done so that players learn about ZOC. Theoretically it could be somewhat defensible by saying that reconnaissance is focused towards the road as the most likely area of enemy movement, and thus represents a much more focused effort than a whole area one.

[17] This represents the provision of supplies and replacements to the unit, but also intangibles like provision of hot food, mail, etc..

[18] This is a harsh penalty for not being able to be resupplied for 1 day, but it ensures that players will take supply seriously.

[19] Very low force densities are possible. See Ukrainian generals' comments on Brigades holding 40km lines in https://www.nationaldefensemagazine.org/articles/2022/6/15/ukraine-to-us-defense-industry-we-need-long-range-precision-weapons (2022), note that this is under the conditions of low force densities on both sides on generally open terrain. This also appears to have been the case as per this source - "the 40th Naval Infantry Brigade's two battalions were stretched over tens of km of the front" (see https://twitter.com/RALee85/status/1596128978024079360, archived at https://archive.ph/r7v8W, 2022). It is worth noting that in an urban environment the frontage of a brigade becomes 6-12 blocks, where 1 block is ~100m (*ATP 3-06 Urban Operations*, July 2022, section 4-42).

[20] Given the very low number of forces in this game, the stacking limits are likely to never come into effect, but are included as they are something worth learning.