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Notes from the Bunker
Building Vehicle Statistics
by Rich Redman

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Welcome to your bunker. I'm Rich Redman, one of the designers of the **d20 Modern** *Roleplaying Game.* I may not be an expert, but I'm experienced and opinionated. Here in the bunker, I explore some corners of the **d20 Modern** rules, create rules variants, and offer suggestions based on my experience writing and running games.

By popular demand, this month's topic is vehicles, and next month's will be vehicle combat. Thanks to Charles Ryan and Chris Perkins, I get to show you the actual system used to derive these numbers for the **d20 Modern** *Roleplaying Game*.

Sweet Ride

A lot of people wonder how to go about creating statistics for new vehicles, but it's not as hard as you might think. In fact, it requires a lot more research than it does thinking, and most of that research can be done online.

As an example, let's derive statistics for a car I just read about this morning, the 2004 Bentley Continental GT.

Information Sources

You can get information about motor vehicles from lots of places. Three of my favorite sites (the ones I used when designing *Thunderball Rally* for *Polyhedron* magazine issue #152 and the original **d20 Modern** vehicle stats) are http://autos.yahoo.com/, http://www.vehix.com, and http://autos.msn.com. I generally use these sites as starting points to get basic information about vehicles. Both also feature links to other sites at which more information is available. Most newsstands have periodicals such as *Road & Track, Car & Driver*, and other automotive magazines. Don't overlook www.roadandtrack.com, www.caranddriver.com, and www.motortrend.com either. You probably ought to bookmark what you're reading right now (or print it out), too.

The Basics

First, determine the vehicle's name, crew, and passengers. You probably know the name already because you want to add a vehicle you're familiar with to the game! Crew, in most cases, is obvious. Very rarely does a vehicle require more than one person to operate -- unless it's a fire truck or military fighting vehicle. Passenger capacity can be a bit tougher to decide, so use your best judgment.

The Bentley Continental needs only a single driver. My information says it's a four-seat coupe, but I've

been around the block a few times and in more than one kind of vehicle. The back seat of a coupe is rarely suitable for anyone larger than a child. Realistically, it can probably carry two passengers comfortably if the one in back sits sideways, but because the performance data is the same for two passengers or three, let's be generous and set the passenger capacity at three.

Performance

I designed an elaborate system for converting real-world data into Initiative, Maneuver, and Top Speed scores when I wrote *Thunderball Rally*. If you use that system, however, your numbers will not match those in the **d20 Modern** game The trick to getting the right numbers is making comparisons. Compare your vehicle to similar ones that already appear in the rulebook. Let me show you what I mean.

The Bentley Continental has a 12-cylinder engine. The numbers say it can go from 0 to 60 mph in 4.7 seconds (another report rates it at 4.3) and has a top speed of almost 200 mph. The Aston Martin Vanquish also has a 12-cylinder engine and seems to fill a similar market niche. It has a -2 Initiative modifier, a +0 Maneuver modifier, and a top speed of 335 squares per round (or 35 squares per round at chase scale).

A little more research on the Bentley numbers turns up more information for the '03 model than for the '04. While looking at the '03 model, keep in mind the little differences. The '04 has a 560-horsepower Volkswagen engine at 1,600 rpm, and the '03 has a 479-horsepower engine at 1,600 rpm, so the '04 appears to have a higher-performance engine. The Aston-Martin is 460 horsepower at 6,500 rpm, so the '04 Bentley appears to be a rocket.

According to *Thunderball Rally*, the '04 Bentley Continental GT's initiative modifier would be +3, but nothing in **d20 Modern** rates that highly, though a few vehicles in ***Urban Arcana*** have +1 ratings. The key to resolving this issue is the comparison. The best available information sets the 0-60 mph time for the Bentley at 4.3 seconds and that of its closest competitor, the Aston-Martin Vanquish, at 4.5 seconds. Those numbers are close enough that they deserve the same initiative modifier, namely -2. The **d20 Modern** system just isn't coarse enough to represent a .2 second difference, and the more powerful engine is pulling more than 1,000 pounds more weight (see Final Details, below).

The Maneuver modifier can be derived from either the 0-60 time or a slalom course. Just refer to the tables below and use the higher result.

0-60 Data		Slalom Data	
Speed	**Equipment Bonus**	**Slalom Speed**	**Equipment Bonus**
Less Than 4.1 seconds	+3	Greater Than 66 mph	+3
4.1-5.0 seconds	+2	61-65 mph	+2
5.1-6.5 seconds	+1	56-60 mph	+1
Greater Than 6.5 seconds	+0	Less Than 56 mph	+0

Since the '04 Bentley GT is not due out until March '04, there is no slalom data available at the time of this writing. A mental comparison between the all-wheel-drive Bentley and the front-wheel-drive Vanquish suggests a +1 rating for the Bentley, but the 0-60 data gives it a +2. That's not a big difference, but it's enough of an apology for the equal initiative ratings.

Top speed is a mathematical calculation, but you can create a table in a program such as Excel to do these calculations for you. First, 200 mph equals 3.33 miles per minute (just divide by 60), or 0.33 miles per 6-second round (just divide the previous quotient by 10). That's 1,760 feet every 6 seconds (multiply miles by 5,280 to get feet), or 352 squares (just divide by 5). All the speeds in **d20 Modern** are given in increments of 5 feet, so I'll round that value down to 350 squares per round. That's faster than the Vanquish except at chase scale, where both go 35 squares per round, and our research supports that conclusion.

Thus, our performance data are as follows: -2 initiative, +2 maneuver, and 350 squares top speed (35 at chase speed).

Final Details

The '03 Bentley's curb weight is 5,072 pounds, compared to the Aston-Martin's 4,046 pounds. The Bentley is 54.7 inches wide and 189.3 inches long, compared to 51.9 inches wide and 183.7 inches long for the Aston-Martin. Although there isn't a lot of payload information available, the Bentley's cargo volume is 12.5 cubic feet, compared to 8.5 cubic feet for the Aston-Martin. The Bentley currently lists for $149,500.

So let's start with cargo. There's no mechanism for converting cubic feet to pounds, but it seems reasonable to set the capacity at 250 lbs. (the equivalent of a Medium-sized passenger, according to **d20 Modern**).

A vehicle's defense depends on its size. The Bentley is 4.56 feet wide and 15.78 feet long. No automobile in **d20 Modern** is smaller than two squares across, and since we always round up for size in the d20 System, the Bentley is 2 squares by 4 squares. That's the same size as the Vanquish -- namely Huge. Table 5-1: Size Modifiers sets its Defense at 8, the same as all the other Huge vehicles.

Since the Bentley is not an armored fighting vehicle, its hardness shouldn't be greater than 5. Its hit points can be determined according to the following table.

Weight	Hit Points	Weight	Hit Points
100 lbs.	2	50 tons	62
120 lbs.	4	60 tons	64
150 lbs.	6	80 tons	66
200 lbs.	8	100 tons	68
250 lbs.	10	120 tons	70
300 lbs.	12	500 tons	72
400 lbs.	14	200 tons	74
500 lbs.	16	250 tons	76
600 lbs.	18	300 tons	78
800 lbs.	20	400 tons	80
1,000 lbs.	22	500 tons	82
1,200 lbs.	24	600 tons	84

1,500 lbs.	26	800 tons	86
2,000 lbs. (1 "short ton")	28	1,000 tons	88
2,500 lbs.	30	1,200 tons	90
3,000 lbs.	32	1,500 tons	92
4,000 lbs. (2 tons)	34	2,000 tons	94
5,000 lbs.	36	3,500 tons	96
3 tons	38	3,000 tons	98
4 tons	40	4,000 tons	100
5 tons	42	5,000 tons	102
6 tons	44	6,000 tons	104
8 tons	46	8,000 tons	106
10 tons	48	10,000 tons	108
12 tons	50	12,000 tons	110
15 tons	52	15,000 tons	112
20 tons	54	20,000 tons	114
25 tons	56	25,000 tons	116
30 tons	58	30,000 tons	118
40 tons	60	50,000 tons	120

Since the Bentley weighs slightly more than 5,000 lbs., it has 36 hit points.

Every other civilian motor vehicle in **d20 Modern** has a restriction of Licensed (+1). The Bentley should be no different.

Now that all those statistics are out of the way, let's turn to Table 7-1: Purchase DCs. With its $149,500 price tag, the Bentley falls between DC 34 and DC 35. A quick game reality check against the Vanquish (which has a lower Manufacturer's Suggested Retail Price, or MSRP) makes that estimate seem too low. Raising the price seems reasonable -- with the import tariffs, transportation fees, and taxes, not to mention the insurance, a buyer is not likely to pay just $149,500 for the car. So let's set its purchase DC at 36. That's a bargain, because you get marginally better maneuverability, more passenger space, and more cargo space in the Bentley than the Aston-Martin. Plus, your character looks really cool driving something hardly anyone else has.

Collected Statistics

See Chapter Four: Equipment in the **d20 Modern** *Roleplaying Game* for explanations of these table headings.

Name	Crew	Pass	Cargo	Init	Man.	Top Speed	Def.	Hard.	Hit Points	Size	Purchase DC	Restriction

Civilian Car Bentley Continental GT	1	3	250 lb.	-2	+2	350 (35)	8	5	36	H	36	Licensed (+1)

Parting Words

Here's a summary of how to create vehicle statistics, plus a few words of advice.

- You don't need to be a vehicle expert to create statistics for vehicles.
- Don't buy the hype. Automobile manufacturers have to sell their products, so they make them look and sound as exciting as possible. Hollywood wants to sell movie tickets, so it exaggerates the performance of vehicles to make films more interesting. Do the research and look at the numbers.
- Looks aren't everything. Few cars perform as well as we imagine they will, or even as well as they look like they can. Do the research and make the comparisons yourself.
- Start with the basics: name, crew, and passengers.
- Keep researching. Look for 0-60 mph tests, slalom tests, top speed tests, and other performance data from which to build your statistics.
- Keep notes. Throughout your research, you'll find other information you need, such as price, weight, dimensions, and so forth.
- Make comparisons. Your goal is to design a vehicle that works within the **d20Modern**game, not to design one that's superior to those already in the rules. So compare your numbers to those of existing, comparable vehicles as a sort of "reality check."

About the Author

Before Rich Redman came to the RPG R&D department at Wizards of the Coast, Inc., he had been an Army officer, a door-to-door salesman, the manager of a computer store, a fundraiser for a veterans' assistance group, and the manager of Wizards of the Coast, Inc.'s Customer Service department. Rich is a prolific game designer who has worked on the **Dungeons & Dragons** game, the *d20 Modern* *Roleplaying Game,* the ***Marvel Super Heroes*** *Adventure Game,* and **Dark*Matter**. When he's not working as vice president of The Game Mechanics, a d20 design studio, Rich does freelance game design, cooks, and practices yoga, tai chi, and silat.