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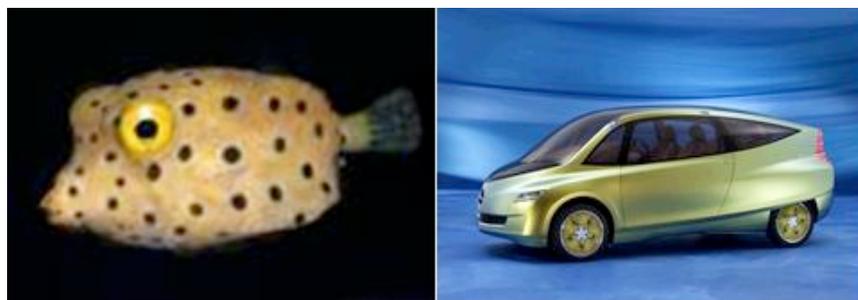
Unexpectedly Intriguing!

Political Calculations

July 10, 2005

Rediscovering Nature

Every ten years, or so it seems, the world's "leading edge" design community rediscovers nature as a source of inspiration for their work. The latest example of this cycle comes from Germany, as car designers at **DaimlerChrysler** have **turned to the sea** for design guidance for their latest concept vehicle. More specifically, they turned to the **lowly boxfish**:



The advantages of designing a car like a boxfish? Here are some excerpts from the **DaimlerChrysler press release**:

The outer skin of the boxfish consists of numerous bony, hexagonal plates which are interlinked to form a rigid suit of armour. This bony, armour-plated structure gives the body of the fish great rigidity, protects it from injury and is also the secret of its outstanding manoeuvrability, as tiny vortices form along the edges on the upper and lower parts of the body to stabilise the fish in any position and ensure that it remains safely on course even in areas of great turbulence. It does not need to move its fins in the process, and can therefore conserve its strength.

Applied to automotive engineering, the boxfish is therefore an ideal example of rigidity and aerodynamics. Moreover, its rectangular anatomy is practically identical to the cross-section of a car body.

Boxfish Aerodynamics

About Political Calculations

Welcome to the **blogosphere's toolchest**! Here, unlike other blogs dedicated to analyzing current events, we create easy-to-use, simple tools to do the math related to them so you can get in on the action too! If you would like to learn more about these tools, or if you would like to contribute ideas to develop for this blog, please e-mail us at:

ironman at politicalcalculations.com

Thanks in advance!

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Recession Probability Track



How aerodynamic, or more appropriately, how hydrodynamic is a boxfish? To answer the question, DaimlerChrysler's engineers used sophisticated computer fluid analysis software and experiments using wind tunnels and water channels to find out the boxfish's **coefficient of drag** (Cd):

Using computer calculations and wind tunnel tests with an accurate model of the boxfish, the Mercedes engineers achieved a value which came very close to this ideal, namely 0.06 – an outstanding result.

Especially when compared to the aerodynamically-ideal shape of a teardrop, which has a Cd value of 0.04. By comparison, most cars have drag coefficients of roughly 0.27. Low drag coefficient values are important in automobile design since the amount of drag produced by a car's motion impacts its fuel economy and stability. The lower the Cd value, the better the performance.

When scaled up to the concept car, the drag coefficient rose to 0.19 - still very favorable compared to most cars. The vehicle's fuel consumption is 70 miles per U.S. gallon (or 4.3 liters per kilometer). This fuel economy is estimated to be 30% greater than that of a similar production vehicle in the same compact class.

Lightweight Armor

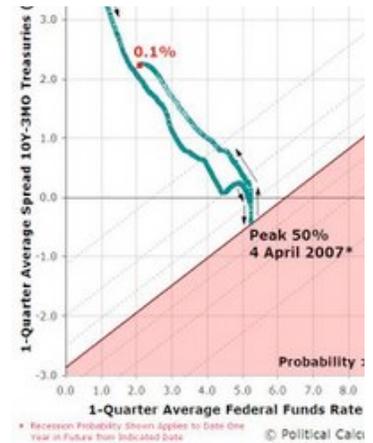
The boxfish also provided the inspiration for designing a lightweight yet very strong and rigid structure for the vehicle. Again from [DaimlerChrysler's press release](#):

The hexagonal scales of the boxfish likewise obey the principle of maximum strength for the least weight. Transferred to the external panelling of a car door, this natural construction principle produces a honeycomb pattern with up to 40 percent more rigidity. If the entire bodyshell structure is configured according to the SKO method, its weight is reduced by around 30 percent – while retaining its exemplary stability, crash safety and handling dynamics.

The SKO method mentioned above refers to the Soft Kill Option method, in which material subject to low structural loads may be eliminated (the Kill portion of the SKO method) or reduced (the Soft portion) while highly stressed areas of the structure are reinforced.

What Next?

Nature is unique in that the design of everything in nature is continuously refined



Political Calculations' Recession Probability Track shows the probability that the U.S. economy will be in recession **12 months from the indicated date** (shown in red) while revealing the probability trend over the past four years.

Previously, the probability of recession peaked at 50% on 4 April 2007, which means that **March-April 2008** is the most likely period in which the **NBER** will find the U.S. to be in recession, should they make such a determination in the months ahead.

On the Moneyed Midways

Political Calculations is also the online home of *On the Moneyed Midways* (aka *OMM*), a review of the best posts contributed to the week's best business and money-related blog carnivals. More than that, we also name one post in each edition as being **The Best Post of the Week, Anywhere!** and at the end of each year, we name **The Best Post of the Year, Anywhere!** as well as identifying the best blogs we found during the course of the year!

The link below will take you to the running index containing our most recent back issues (you can easily navigate the index to find older editions.)

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over millennia. The end results of that kind of design process are products that ideally adapted for their role within nature. What I've always found odd is that where the world's bleeding-edge designers are concerned, nature goes in and out of style - you would think they would gather more inspiration from the world around them than they do. Maybe they won't forget what they discover this time. Knowing them though, they probably will....

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