Kerbal Space Program - Bug #21426

Autostrutted boosters w/ rigid attachment enabled

03/01/2019 03:22 PM - Convergant

Status:	New		**Start date:**	03/01/2019
Severity:	Low		**% Done:**	0%
Assignee:				
Category:	Physics			
Target version:				
Version:	1.6.1		**Language:**	English (US)
Platform:	Windows, XBoxOne		**Mod Related:**	No
Expansion:	Making History			

Description

I recently built a large craft (~2.25kt on the pad) which had 4 boosters attached to it. To ensure that I would not have attachment issues (which frankly shouldn't exist, but regardless), I enabled both autostrut and rigid attachment on them. This originally occurred on a moderately modded save, so I replicated it in a fully stock version of the game. I recorded this occurring on a stock save here:

https://youtu.be/jPjxZ0c0sZQ

The craft file can be found attached.

It confuses me as to how exactly this has arisen (rigid joints are not massively complex, and tbh should be the default), but regardless I hope to see this resolved soon! :)

History

#1 - 05/05/2019 10:26 PM - weissel

It seems that "rigid" is not enough to stop rotations on a side decoupler enough to stop a catastrophic outcome from a SAS induced resonance wobble.
You want a strut at the top and/or bottom to stabilize the boosters.
Also be aware that rigid is not stronger, it's in fact more brittle (it tends to break before bending).

So the only potential bug would be: *Is a _rigid_ connection from, say, a booster tank to a decoupler meant to suppress rotations around the decoupler?*

PS: Autostrut attaches at the part's COM, so it will not be super helpful with rotations. You can toggle and change an autostrut in flight.
If you choose heaviest part or root part, the autostrut will change it's connection automatically and immediately when these parts change (decoupling from a space station, emptying a heavy fuel tank enough), although none of these are a factor in your case.

#2 - 05/05/2019 11:14 PM - Convergant

weissel wrote:

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I (and I imagine a lot of people) interpret "rigid attachment" as meaning that the parts involved are connected using rigid joints. As seen in the Wikipedia article on rigid body dynamics, "The assumption that the bodies are rigid, which means that they do not deform under the action of applied forces..." If bodies do not deform under applied forces, it follows that things attached by rigid joints should not rotate around each other (unless specifically designed to do so without any deformation, which seems unlikely in the context of a booster). Therefore, it seems that rigid attachment not preventing rotation around a decoupler is a bug. I can understand (and in fact agree with) rigid joints in KSP being destructible - I find it counter-intuitive that a rigid attachment would be weaker, but I don't see it as a major concern.

On this being SAS induced, although that could've been a factor, the underlying cause is simply steering the vehicle leading to such large aerodynamic and/or shear forces that the attachments break. SAS may be steering the vehicle to correct for any attitude changes, but as can be

seen here: https://youtu.be/_HbCH4uBtiY, with SAS off the detachment can be easily induced. I've seen SAS cause similar issues a number of times, but here seems to be an exception.

Files

Untitled Space Craft.craft	245 KB	03/01/2019	Convergant