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1 Introduction

This report contains all the relevant results of the vehicle dynamics tests carried out on the Ambulance by the CarSim simulation program.

2 Project Description

The table below shows the test program of the project:

		Test conditions		
		V _x	Z Surface	Radius
Test		Km/h	m	m
1	Road Elevation	100	0.15	-
2	Rounding Around	60	0	5

Description of configurations:

Conf 1	Conventional Suspension
Conf 2	Creuat Suspension

Matrix

Conventional suspension data

```
SYSTEMSPECS Type=[CREUAT_GENERIC]. Copyright (c) Creuat S.L. 2003 (1.0)
SPRINGS MATRIX (ROW 0) (N/MM) = [ 30.0,-10.0, 0.0, 0.0]
SPRINGS MATRIX (ROW 1) (N/MM) = [-10.0, 30.0, 0.0, 0.0]
SPRINGS MATRIX (ROW 2) (N/MM) = [ 0.0, 0.0, 80.0,-15.0]
SPRINGS MATRIX (ROW 3) (N/MM) = [ 0.0, 0.0,-15.0, 80.0]
DAMPERS MATRIX (ROW 0)N/MMS-1) = [ 5.0, -2.0, 0.0, 0.0]
DAMPERS MATRIX (ROW 1)N/MMS-1) = [ -2.0, 5.0, 0.0, 0.0]
DAMPERS MATRIX (ROW 2)N/MMS-1) = [ 0.0, 0.0, 5.0, -2.0]
DAMPERS MATRIX (ROW 3)N/MMS-1) = [ 0.0, 0.0, -2.0, 5.0]
```

Creuat suspension data

```
SYSTEMSPECS Type=[CREUAT_GENERIC]. Copyright (c) Creuat S.L. 2003 (1.0)
SPRINGS MATRIX (ROW 0) (N/MM) = [ 18.0,-10.0, 0.0, 0.0]
SPRINGS MATRIX (ROW 1) (N/MM) = [ -6.0, 30.0, 0.0, 0.0]
SPRINGS MATRIX (ROW 2) (N/MM) = [ 0.0, 0.0, 80.0,-10.0]
SPRINGS MATRIX (ROW 3) (N/MM) = [ 0.0, 0.0,-15.0, 30.0]
DAMPERS MATRIX (ROW 0)N/MMS-1) = [ 2.0, -2.0, 0.0, 0.0]
DAMPERS MATRIX (ROW 1)N/MMS-1) = [ -0.5, 5.0, 0.0, 0.0]
DAMPERS MATRIX (ROW 2)N/MMS-1) = [ 0.0, 0.0, 12.0, -1.0]
DAMPERS MATRIX (ROW 3)N/MMS-1) = [ 0.0, 0.0, -4.0, 4.0]
```

3 Vehicle specifications:

3.1 Technical characteristics

Dimensions	Length	6000 mm
	Width	2500 mm
	Height	3000 mm
	Length between wheels	4000 mm
	Width between wheels	1900 mm
Engine	Size	5000 cc
Sprung mass		3000 Kg
Unsprung mass	Front	100 Kg
	Rear	120 Kg
Axle Load	Front	1150 Kg
	Rear	2070 Kg
Rear – wheel drive		Viscous – Gear ratio 4.4
Front suspension	<i>Parts number</i>	
	Spring	20 KN/m
	Damper	3 KN/ms ⁻¹
	Stabiliser (wheel equivalent)	40 KN/m
Rear suspension	<i>Parts number</i>	
	Spring	40 kN/m
	Damper	7 Kn/ms ⁻¹
	Stabiliser (wheel equivalent)	70 KN/m
Nominal steering	Front Gear ratio	20.0 deg/deg
	Rear Gear ratio	20.0 deg/deg
Wheels	Rim dimension	R16
	Tire widh	275 mm

3.2 Wheel alignment

The wheel alignment of the vehicle was done with the vehicle in the test condition (with instrumentation, without driver):

		Left	Right
Front	Camber	0.0°	0.0°
	Caster	2.0°	2.0°
	Kingpin inclination	12.0°	12.0°
Rear	Camber	0.0°	0.0°
	Caster	1.0°	1.0°
	Kingpin inclination	8.0°	8.0°

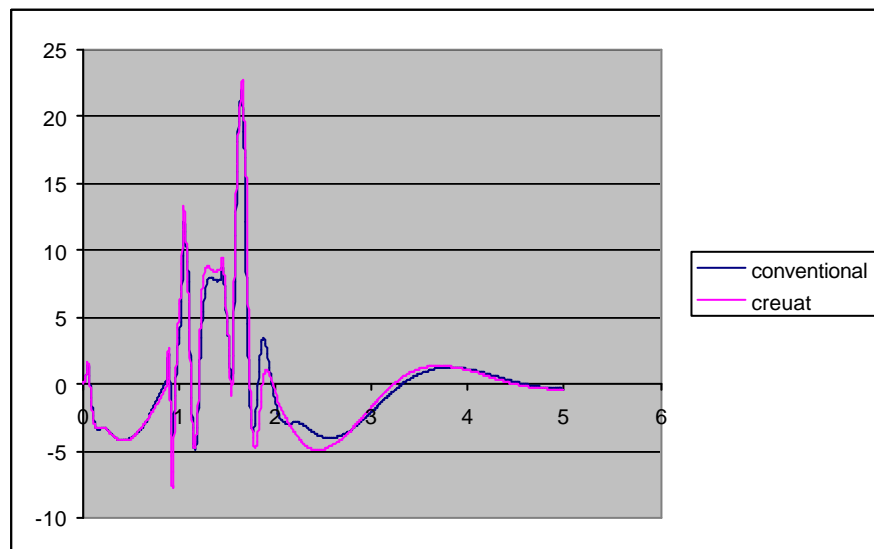
4 Test results

4.1 Road elevation

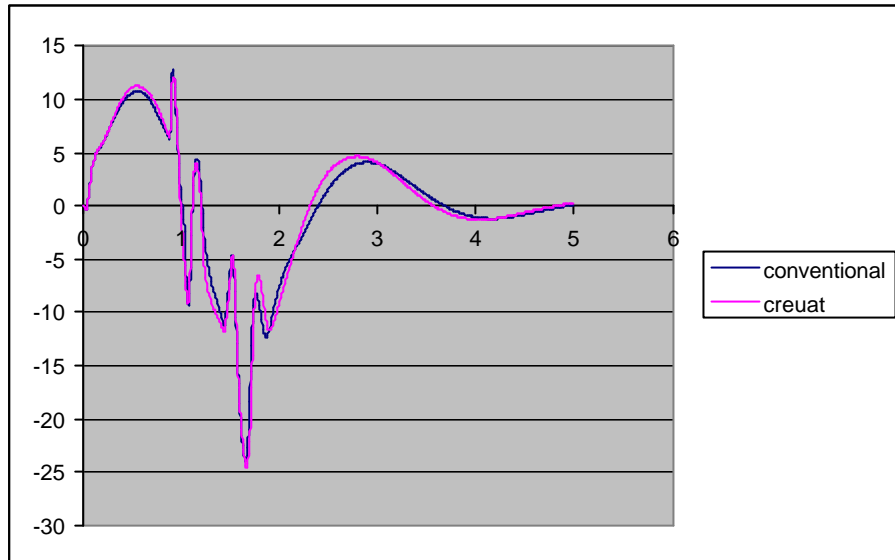
General conditions

Road surface:	Asphalt
Friction surface:	0.85
Frequency:	1000 Hz
Time step:	0.001 Hz

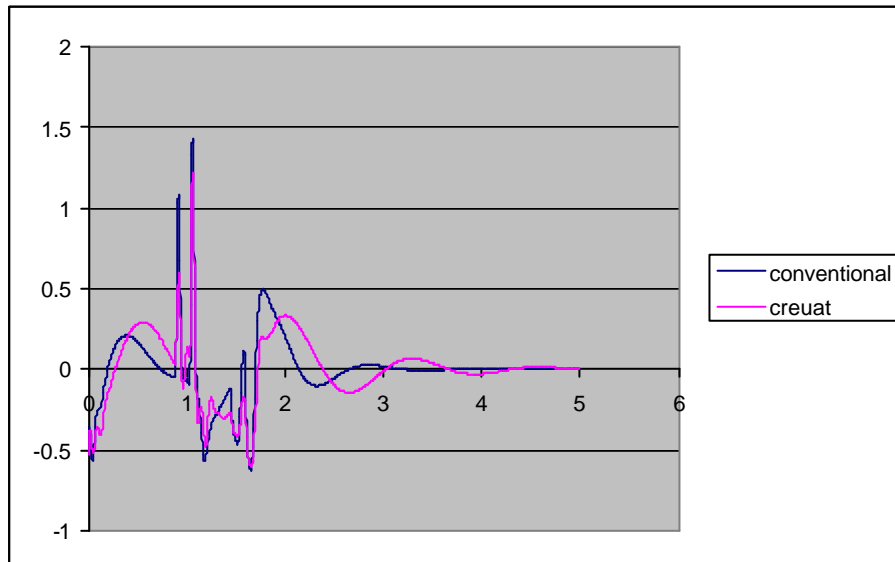
Slip angle rate



Yaw rate



Vertical acceleration

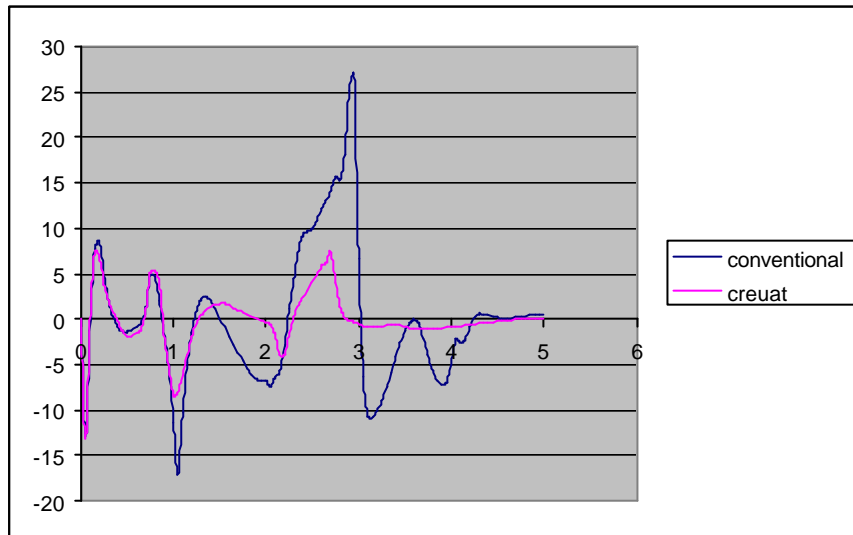


4.2 Rounding around

General conditions

Road surface:	Asphalt
Friction surface:	0.85
Frequency:	500 Hz
Time step:	0.002 Hz

Slip angle rate



Yaw rate

