5.21

问题：

Git使用时，不要将含有.git的 文件夹拷贝到另一个含有.git的文件夹中。

不小心删了以前的workinglog 和 ppt 损失严重！~

180509\_ESR-038654截面尺寸14\*5mm，实验段长度84mm，获得力位移曲线

5.29

气袋折叠Joefold

\\ach-fs01\IT\Simulation\7\_15\_Joefold

Y:\doc\09\_CapabilityImprove\03\_AirbagFolding

Dyna 的后处理可以采用cfile

5.30

折叠气袋算例

Y:\cal\01\_Comp\03\_PAB\287\_180510\_ESR\_038665\_OH\_PAB\_HOUSING\_STRENGTH\_Zheng\01\_Input\Fold

5.31

在需要提取DEFORCE的结果时所设置的弹簧刚度应当尽量小。有两个好处，一个是计算速度会上去，二可以避免其它部件的冲击引起的微小振动将弹簧自身的拉力淹没。另外，增加阻尼单元，阻尼单元有助于降低可能存在的震荡。对于准静态的分析尽量采用隐式求解。

SB模型(由于始终位移增加，力会持续做工，能量持续输入的)分析结果验证标准：

动能/内能 <= 0.05 质量增加<2%

Quasi-static conditions must have been achieved at tensile strength requirement load level, i.e. ratio of kinetic energy/internal energy ≤ 0.05 as in ACES 001 “SB anchor plate tensile simulation” [E1009796](http://plm.autoliv.int/linkto/specific/CAE/E1009796/000).

Maximum mass scaling for the total models with webbing included has to be ≤ 2%.

The limited equivalent plastic strain is used to evaluate the structure’s strength. The tie bars and frame present a failure risk when plastic strains above these strain limits appear over half of part thickness, see Fig. 5.7.1.

Limits are 16% equiv. plastic strain using S500MC, 14% equiv. plastic strain using S550MC. Parts present a failure risk when plastic strains above these strain limits appear over the part thickness.

The evaluating failure criteria of SB components are referred to ACES 903 as [E1220066](http://plm.autoliv.int/linkto/specific/CAE/E1220066/000)

‘Breakage’ is very common in AUTOLIV tests: The test philosophy is “test to failure”. Such tests have, by principle, a large spread in the results. Repeated tests never lead to the exact same result, a simulation does. Therefore, it is impossible to exactly predict breakage with a simulation as it is a matter of statistical chance. A failure criterion, therefore, is always a statistical tool only.

气囊点爆

Criteria to reach at the end of the relaxation to validate the state:

Contact force resultants: Fcntc < 103N,

Internal energies: ∆Eint ≈ 0,

Damping energies: Edamp < 0,10 \* Etot,

Kinetic energies: Ek << Eint,

Total energies: ∆Etot ≈ 0.

For (sheet-)metal parts, plastic equivalent strain is commonly evaluated:  
**PEEQ < εlimit**

For brittle (cast-)metal parts, max. principal stress is appropriate  
**σp,max < σlimit**

For polymer parts, max. principal strain useful, or mises stress (even if „principally wrong“)   
**εp,max < εlimit**

**σmises < σyield**

6.5

采用动力学评定时，要区分应力还是应变评定，如果部件截面中大于breakage strain的应变单元超过厚度的1/3，即可认为失效，并进一步分析失效的形式，包括：Functional failure，功能失效、part buckling部件屈曲、断裂（Breakage）。

如果通过单轴拉伸获得力-位移曲线，转换成应力-应变曲线时，要注意塑性应变=etot – eelas=etot – sigma/E

0606

1.[05 Simulation\_ESR\_guideline\_CTC](http://alvteams.alv.autoliv.int/sites/ctcplmteam/testing/TestingDVM%20Training%20Material/01-DVM%20%e5%9f%b9%e8%ae%ad%e8%ae%b2%e4%b9%89/05%20Simulation_ESR_guideline_CTC.pptx)

2.叠气袋时，生成的PC的文件要修改版本号和删除file m，求解前最好用visual检查模型质量

Y:\cal\01\_Comp\02\_DAB\362\_180517\_ESR-038398\_CN300M\_DAB\_deploy\01\_input\Cn300\_DAB\_folding\mbp3

0620

四面体单元ELFORM =-1/-2

六面体单元ELFORM = 13

Inflator标准http://aamteams.alv.autoliv.int/sites/aaminflatorsimulation/OTC\_Inflator\_Simulation\_Requests/2014%20Simulation%20Data/Forms/AllItems.aspx

DAB分析需要注意接触，还有气袋展开时间TSFRAC曲线的设置。

0622

塑料的应变率和应变曲线可以采用24号卡片和89号卡片，其中24号卡片中的应力应变曲线为有效应力和有效塑形应变，而89号卡片采用的真应力和真应变，两者之间的转变关系：有效应变 = 总应变 - （真应力/弹性模量），其中弹性模量采用单轴拉伸的屈服点（也有人讨论由于循环载荷下材料发生硬化，其真实的弹性模量也会发生变化）

因此，24号卡片的应力应变曲线不应当从0开始，而89号卡片应力应变必须从0开始。当然，需要注意偏移参数的设置。

发生器的对标，可以采用Tank分析，主要对照Glstate中输出的压力曲线和试验给定的Pmax，如果相差不大即可认为当前的发生器符合要求。

选择塑形点区分弹性区和塑形区的方法：

第一种，选取线性区域作为弹性模量，结果会高估塑形应变；另外选择塑形点作为弹性模量，会低估材料弹性区域的刚度。目前，MAT24材料更倾向于第一种方法。

Cowper-Symonds模型的优势，可以光滑外推。两个劣势，以及率相关的屈服现象，因此对高应变率，描述不准确。解决方法，采用LCSR提交一个针对每个应变率的缩放表。有两个优势，一消除了高应变率下噪音，二有能力对高应变率下进行外推。

As can be seen in Figure 3, fidelity to the linear elastic region results in an overprediction of plastic strain because the material continues to be elastic at stresses far exceeding the "linear-elastic" region. On the other hand, using a secant modulus to describe the behavior up to the plastic point results in a material model that significantly under-predicts the stiffness of the material in the elastic region. Currently, with the the MAT24 model, there is no recourse other than to choose, pragmatically, a plastic point that is somewhere in between these extremes, often leaning toward the first strategy so as to be as close as possible to the stress-strain data. Once EMOD has been chosen, it is a simple matter to discretize the static stress-strain and convert the data into plastic strains following the normal rules of the elastic plastic model. Applying the Cowper-Symonds equation, it is now possible to scale this curve to other strain rates. The equation has the advantage of smooth extrapolation without limits. However, since the equation is incapable of truly describing the rate dependency of the yield phenomenon, it cannot accurately scale the plasticity curve to high strain rates. A possible solution is to use the LCSR option, which permits the submission of a table of scale factors for each strain rate. LCSR is an interesting option which allows fidelity to the test data. However, it must be used with caution. High strain rate data is experimentally difficult to obtain so that there is often scatter in the data. This scatter must be smoothed in some way so that the resultant model contains no spurious behavior. Since we know that the Eyring Equation appears to accurately describe the rate dependency of most plastics, the LCSR table can be derived from a best fit of the yield stress v. log strain rate data. This approach carries two advantages: first, the elimination of noise and second, the ability to extrapolate the model to 'higher that tested' strain rates, since LCSR based MAT24 terminates rate dependency computation when the highest strain rate in the table is exceeded. Using MAT24 with LCSR as described above, we can successfully overcome the limitation of the Cowper-Symonds model in the simulation of plastics rate-dependency.

When this slope falls below the modulus E specified in the material card, the material is assumed to have yielded. The treatment of plasticity then follows MAT24, as described earlier.

0625

延伸率为增量与长度只比。

DAB分析应变率是需要考虑: 高低温材料和不同应变率下脆性-塑性转变，甚至有些材料需要调整。

Pros and cons 正反两个方面。

超弹材料：弹性阶段展现出高非线性特性；金属：屈服前有明显的线弹性特性了；塑料：在屈服前已经存在明显的塑形，并且弹性阶段为非线性。 (http://www.datapointlabs.com/testpaks/ls-dyna07/ls-dyna07\_paper.htm) (https://www.dynalook.com/european-conf-2007/methodology-for-selection-of-material-models-for.pdf)

Mat24 塑料材料模拟存在的问题：

塑料在弹性阶段也存在较强的非线性；24号材料用于弹性模量为线性的材料，因此不能准确预测塑料的刚度。

The addition of fiber reinforcements to plastics is a common practice to increase the strength of these materials. In addition to an increase in stiffness, the nature of the failure changes when fillers are added. In the extreme cases, such as highly glass filled plastics, the failure changes from ductile to brittle. Interestingly, with intermediate fiber loadings, there is a gradual change from ductile to brittle failure with the increase in strain rate. This variation in post-yield behavior with strain rate is not easily captured in available material models today.

Nuance 细微差别

Note that the degree of crystallinity and molecular orientation are affected by the fabrication process, which could lead to anisotropic mechanical response in solid polymers

# Works Cited

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