



Czech Technical University in Prague

Dept. of Mechanics, Biomechanics and Mechatronics

It's a Free, Free World

What You Can Find on www.pragtic.com
and How to Use It

Jan Papuga

Workshop on Computational Fatigue Analysis 2008 & 2nd PragTic Users' Meeting

Kamenice nad Lipou, Czech Rep., Oct. 29-31, 2008

Screen Print of www.pragtic.com

User: [unknown](#) || [Login](#) || HOT NEWS: [PragTic v.0.2betaG](#), [2nd Users' Meeting](#), [Section News](#), [PragTicA](#)

- PragTic Freeware Project
- Concept
- PragTic SW
- Author
- FAQs
- Bugs

- Database of Fatigue Limits
- Concept
- FatLim DB
- References
- Material DB
- Glossary

PragTic Freeware Project



PragTic project is aimed at development of a freeware tool for an automated fatigue damage calculation based on a FE-solution or done in some singular point. It started as a programming work intended to support the preparation of my PhD thesis. After completion of the [thesis](#), the [PragTic software](#) remained in a state, which showed its possible highly efficient use, but also how many further improvements have to be done. Since I wouldn't like to leave the program as is and let it find a way how to conti

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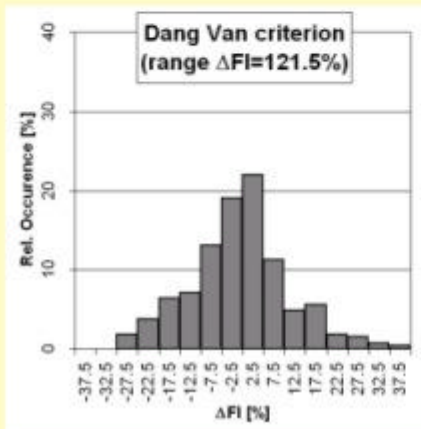
- 1. PragTic Freeware
- 2. FatLim Database

- Fatigue Lounge
- News
- Users
- User Profile
- Conferences
- Forum
- Reports
- Links
- Sponsors

- PragTicA Project
- 2nd PragTic Users' Meeting
- Application
- Payment
- Transport
- Program
- Gallery

- 3. Fatigue Lounge
- 4. PragTicA Project

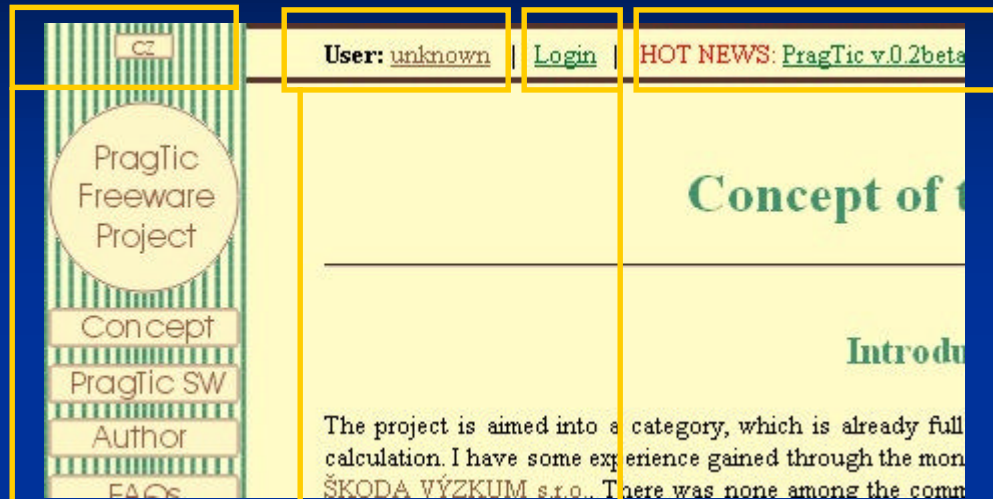
Database of Fatigue Limits



The use of PragTic allowed me generation of a vast amount of data that can help others to understand limits of current multiaxial high-cycle methods. The data are saved within a MySQL database [FatLim](#), which in conjunction with the PHP language allows presentation of data in a quite interactive mode.

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Basic Interface



HOT NEWS section for getting a quick information on the most important changes on the website

Username of the user if currently logged in

Access to the login/logout script, search for a lost password

Switch between **CZ**ech and **EN**glish languages (not enabled on every page, English preferred)

Notification System

The screenshot shows the PragTic Software website's notification system. At the top, the user is logged in as 'jan' and can access 'Logout', 'MAIL', and 'HOT NEWS' (with links to PragTic v.0.2betaG, 2nd Users' Meeting, Section News, and PragTicA). The main heading is 'PragTic Software'. A navigation menu on the left includes 'PragTic Freeware Project', 'Concept', 'PragTic SW', 'Author', 'FAQs', 'Bugs', and 'Fatigue Lounge'. A navigation menu on the right includes 'Database of Fatigue Limits', 'Concept', 'FatLim DB', 'References', 'Material DB', 'Glossary', and 'PragTicA Project'. The notification system is highlighted with a yellow border and contains the following text: 'Notification system: I want to be informed about any of the following changes:'. Below this, there are two checked options: 'Any beta or alpha version released' and 'Full and stable alpha version released'. There are three buttons: 'Save my preferences', 'Notify beta', and 'Notify alpha'. At the bottom, there is a link for 'Commentary to Actual Versions'.

- Access through:
 - User Profile and Your preferences button at the bottom - all available items are offered for selection
 - Individual items can be selected on their respective sites (when logged in)

Users' Access Levels



group	what who can...	visitor	participant at the UM	anonymous user	privileged user	moderator	administrator
	view the most of pages	X	X	X	X	X	X
	attend the user meeting		X	X	X	X	X
PragTic	download Help to PragTic	X	X	X	X	X	X
	download PragTic			X	X	X	X
Forum	visit Forum				X	X	X
	write to Forum				X	X	X
	regulate Forum					X	X
Databases	view content of databases	X	X	X	X	X	X
	add items to databases				X	X	X
	edit items in databases as their manager				X	X	X
	edit any items						X
	delete items in databases						X

1. PragTic Freeware

- Why I am doing that (Concept)
 - Download (PragTic SW)
 - Online Help (PragTic SW)
 - Contact to my person (Author)
 - FAQs
 - Bugs
- To be consulted before every important calculation

Reporting of Bugs in PragTic

- Any registered (and logged in) user can report bugs he finds in PragTic

2008-09-15 17:58:10	ID(28): Collapse after asking for results on CTRIA6 or CTRIAR elements	Manager: jan  
Report: If any of both these element types (MSC.NASTRAN) is within the description of results, the viewing of the results collapses.		Reported for: 0.2betaG
Admin commentary: There is an error in the respective *.ein files. Look for CTRIA6.ein and CTRIAR.ein in the directory, where you have placed WinPragTic.exe, open the files for edition and change the line "RLCN,8" to "RLCN,6". This should solve the problem. No repated import of the result data should be necessary.		Removed in: 0.2betaH
		Severity: minor

What the user / reporter inputs

What I input

- Scale of bugs severity
 - Minor – interface, or simple bypass
 - Medium – clear manifestation, but can affect the results
 - Substantial – unclear manifestation, affecting the results, there is bypass way
 - Critical – no easy way around and heavy impact on the results

2. FatLim Database

- Why I am doing that (Concept)
- Set of databases FatLim DB, References, Material DB)
- Explanation of some keywords (Glossary)

FatLim DB Limits

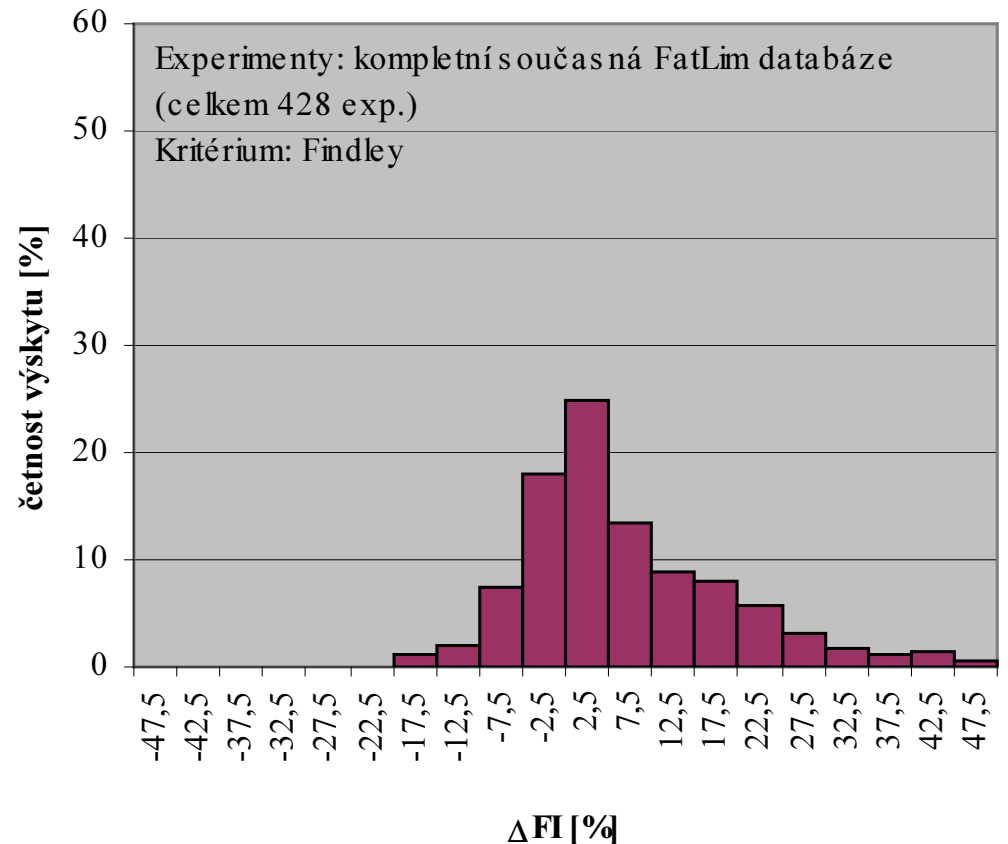
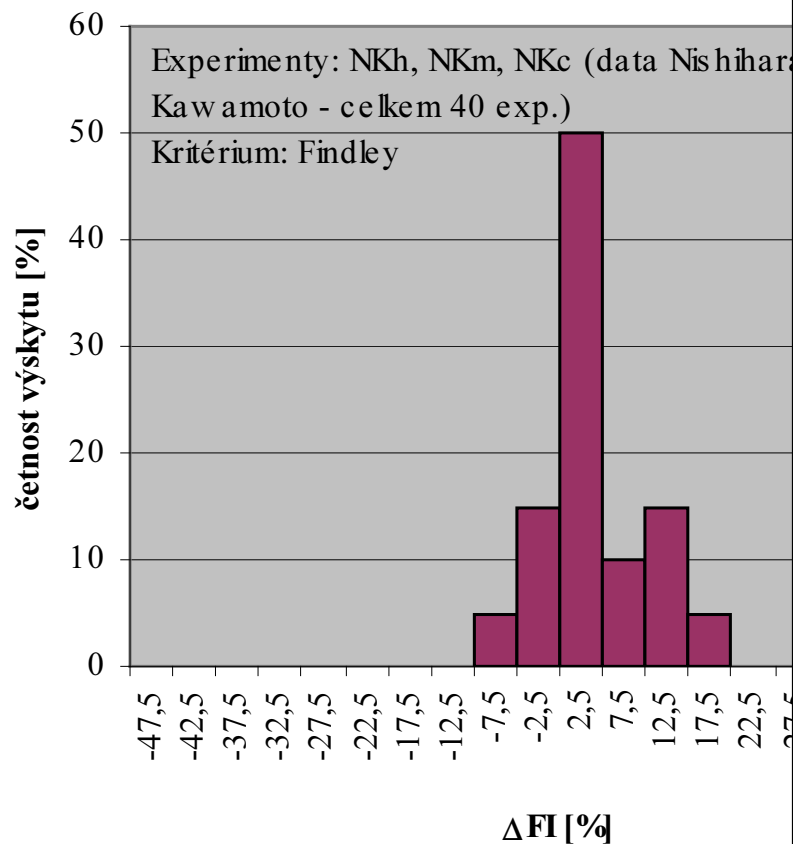
- Experiments related to multiaxial fatigue limits
- Load types – harmonic or static
- Specimens types – smooth, unnotched

Reasons for FatLim Internet Database

1. proof of a suitability of my own method (see Int J Fatigue 1/2008)
2. ensuring that only verified error-free experimental data are used
3. comparing different existing methods and sort them according to their results in different categories
4. providing a tool, which would tell what quality of results you can expect for your type of loading and the material used
5. overcoming problematic points noted in the next slides

Common problems – “Soft” Data

Evolution rule I: The sets of experiments which “meet wishes” of the methods are preferred



Common Problems – „Softened“ Data

- **Evolution rule II:** If some experiment in the set of experiments does not suit you, remove it.
- Often reproduction of data from secondary sources prevents detection of such cases and also hides the originator of the softening

NINIC, D.; STARK, H. L.: A multiaxial fatigue damage function. Int. Journal of Fatigue 29, 2007, pp. 533-548.

Case	Remark	σ_a [MPa]	σ_m [MPa]	τ_a [MPa]	τ_m [MPa]	δ [deg]	ΔFI
FI801	PB	157,9	82,8	0,0	0,0	0	12,0%
FI802	PB	143,4	206,9	0,0	0,0	0	28,8%
FI803	PB	138,6	310,3	0,0	0,0	0	43,4%
FI804	PB	131,0	448,3	0,0	0,0	0	58,3%
FI805	PB+To	161,4	0,0	33,4	0,0	0	-0,5%
FI806	PB+To	124,8	0,0	62,4	0,0	0	-7,2%
FI807	PB+To	124,1	82,8	62,1	41,4	0	11,2%
FI808	PB+To	115,2	206,9	57,6	103,4	0	33,6%
FI809	PB+To	103,4	310,3	51,7	155,2	0	43,5%
FI810	PB+To	102,8	0,0	75,2	0,0	0	-8,7%
FI811	PB+To	79,4	0,0	95,9	0,0	0	-0,9%

FINDLEY, W.N.: Combined-stress fatigue strength of 76S-T61 aluminum alloy with superimposed mean stresses and corrections for yielding. NACA Technical Note 2924, May 1953.

Common Problems – Intersection

- Great number of various methods
- If a new criterion is introduced, the results reported are for:
 - the new criterion
 - only several older methods (less adequate, simple to compute)
- The comparison among newer methods is missing

	Crossland	Dang Van	Findley	Fogue	Goncalves	Liu & Mahadevan	Liu & Zenner	Matake	McDiarmid	Ninic	Papadopoulos	Robert	Sines	Spagnoli	other
Banvillet et al. (IJF 2003)	X	X									X				X
Carpinteri & Spagnoli (IJF 2001)			X					X	X						
Goncalves et al. (IJF 2005)	X										X				X
Liu & Mahadevan (IJF 2005)								X	X		X				
Papadopoulos et al. (IJF 1997)	X							X	X				X		X
Ninic & Stark (IJF 2007)									X					X	X
Zenner et al. (IJF 2001)											X				
Bernasconi et al. (IJF 2006)		X					X				X				
pořadí v úspěšnosti ve FatLim*)	6	12	9	5	4	7	8	14	1	3	11	2	13	10	

*) Ranking of the method's overall results in FatLim

Problems – Publishing of Research Results

- Due to limited allowable scope, a common research paper can be published only in two ways
 - Complete description of results for a small experimental set
 - An overall conclusion of results without detailed data

Paper	Number of experiments	Details
publikace	počet experimentů	detaily
Banvillet et al. (IJF 2003)	38	ano
Carpinteri & Spagnoli (IJF 2001)	30	ano
Goncalves et al. (IJF 2005)	41	ano
Liu & Mahadevan (IJF 2005)	57	ne
Papadopoulos et al. (IJF 1997)	43	ano
Ninic & Stark (IJF 2007)	108	ano
Zenner et al. (IJF 2001)	179	ne

CZ ~ EN

ano ~ yes
ne ~ no

FatLim - Selector

- At present:
 - 437 experiments
 - 18 calculation methods
- Statistic evaluation is prepared automatically for data chosen in the selector

Select test group:

Select material:

1st axial channel (Ax1) 2nd axial channel (Ax2) torsion channel (To)

Apply loads:

Mean stress: > 0 MPa > 0 MPa = 0 MPa

Amplitude: MPa MPa MPa

Phase shift: Ax1 v. Ax2 Ax2 v. To To v. Ax1

degrees degrees degrees

Select asynchronous loading only

Results of Methods:

Select methods of computation...

Sorry, I do not have time enough to provide once again the explanation, which calculation method is defined in which way. If you are interested in the description of individual methods, [download the PragTic Help](#) (available free without any registration), where a description of methods and even of their implementation into PragTic can be found.

New Experiments to FatLim?

1. Change your profile to the privileged user if you have been the anonymous user up to now ([Edit Profile](#))
2. Add all new authors ([References](#))
3. Add new proceedings or journal ([References](#))
4. Add the paper itself ([References](#))
5. Add the material data ([Material DB](#))
6. Add the experimental load data ([FatLim DB](#))
7. Add the result data to the experiments ([FatLim DB](#))

Databases, to Which Users Can Input

- Bugs (-> PragTic Freeware Project)
- Users (-> Fatigue Lounge)
- Conferences (-> Fatigue Lounge)
- References (-> Database of Fatigue Limits)
 - Authors
 - Papers
 - Proceedings
 - Journals
- Material DB (-> Database of Fatigue Limits)
- FatLim DB (-> Database of Fatigue Limits)
 - fatigue experiments at fatigue limits
 - corresponding prediction results
- Forum (-> Fatigue Lounge)

User Inputs

- The databases allow input of own data to registered users
- How to ensure **credibility of presented data?**
 - **Sign** of the registered users
 - **Manager** function
 - Once you add some data, you are the responsible one to take care of them
 - Only the manager or administrator can revise this particular data
 - If you want to **revise the data of another manager**
 - Write the revise proposal
 - It is documented, the manager is informed
 - The **manager has a 30-day time limit**, in which he has to accept or decline the proposal
 - If the proposal is declined, the proposer still can write to the Forum
 - If the manager does not do anything, the new proposal rewrites the original data and the proposer becomes its manager

Prepared feature

User Inputs

Basic Common Interface



- Report on the fact who is the Manager of the item
- **E** button – edit the data (visible to Manager only)
- **S** button – sign the data (visible to any user logged in)
- **RS** button – remove your sign (visible to the user logged in, who previously signed the item)
- **D** button – delete the data (visible to Administrator only)

Functions and Databases I Miss

- FinLiv – similar to FatLim but extended
 - Type of notch
 - Manufacturing technology
 - Number of cycles
- FatLim and FinLiv extension?
 - Load path type
- Edit system for other people than managers
- Notification system for the Forum, Materials and FatLim

Help Wanted

- **Work with the databases:** I started to build first databases after two days of study
- **Search for new data:** The material database can be very helpful to anybody of you, if continuously expanded

3. Fatigue Lounge

- List of users (Users)
- Access to your user profile and to your setup of Notification System items (Edit Profile)
- Forum
- Board with news (News)
- Database of conferences (Conferences)
- Some reading, usable references – Reports
- Links
- Sponsors

News

Define your view:

All News
PragTic Development
Changes on the Web
Fatigue Calculations
Dissemination of Projects
Next Steps?
Personal Stuff

Sort by: date section

Only newer than: days

Show New news

- A database editable by me (administrator) only
- The Notification System activated
- If logged in, the news inserted into the system after your previous last login are shown immediately on the main News page.

Forum

- Enabled for privileged users only
- Nobody uses it, why? (I know about people registered to PragTic just to look there)
 - It is too empty (somebody should start to raise question ☺)
 - People are not used to ask there (Why? Look on iMechanica.org forum – a minimum interest in fatigue calculations is obvious!)
 - Coupling with e-mail box through Notification system is missing
 - Inadequate forum topics

Conferences

- List of conferences related to
 - fatigue
 - FEM, FEA-post-processing
- Implemented
 - Notification System
 - Input system available for registered users
- Note – the selecting system does not work with IE, only Mozilla/Firefox is fully functional
- **S, RS** buttons
 - another function here
 - user declares that he comes (**S**) to the conference or decided not to come (**RS**)

Help Wanted

(I do not know about any other similar page related to the central European region – help me to keep it up-to-date)

17th International Workshop on Computational Mechanics of Materials; Aug 22, 2007 - Aug 24, 2007;
Paris, France
Deadline for abstract: Mar 16, 2007
Web pages: <http://iwcmml7.enscm.fr/>
Attendants: hruby

Manager:

jan

E S D

4. PragTicA Project

(PragTic in Application)

- Applied to European Commission within FP7 scheme
- Consortium of companies and universities
 - Evector, CZ (PragTic)
 - Brno University of Technology, CZ (MSC.Fatigue)
 - CDM IT ASCR, CZ
 - Centro Ricerche Fiat, IT
 - CTU in Prague, CZ (Fe-Safe)
 - Delft University of Technology, NL
 - Fatec Engineering, NL (fFatigue)
 - IPM ASCR, CZ
 - Materials Engineering Research Laboratory, GB
 - SKODA VYZKUM, CZ (FemFat)
 - Trinity College Dublin, IRL
 - University of Parma, IT
 - Vision Consulting Automotive, CZ (expected WinLife)