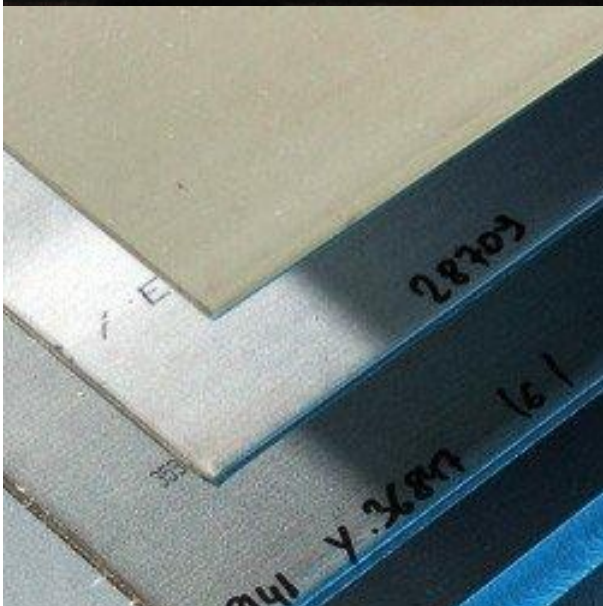
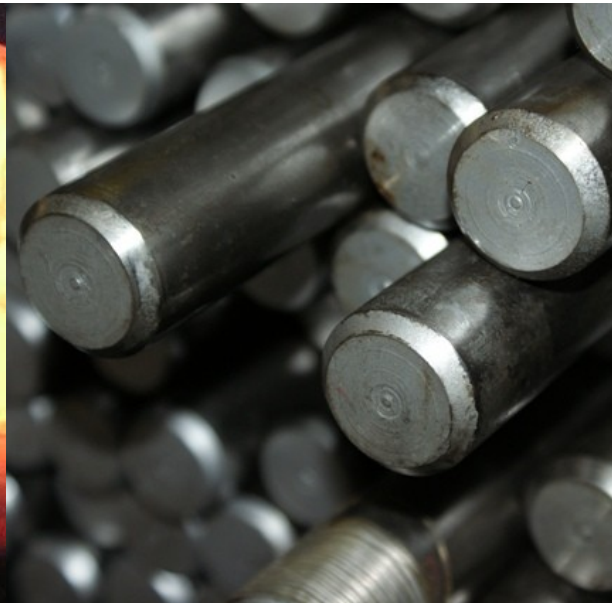
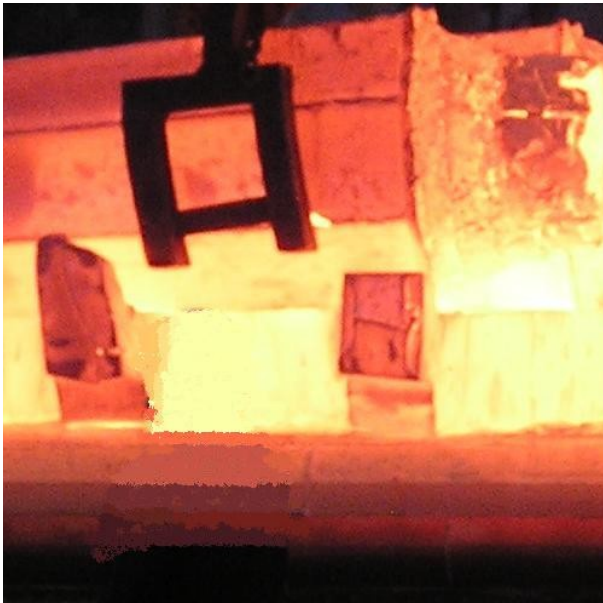


Easier. Faster.

easy2forge

Open-Die Forging Software





Vision

Our Open-Die Forging Software is more than just a tool you use to manage your forging process.

Our mission is simply to make your forging business as efficient as possible.

The software is adapted to your requirements and not vice versa.

We focus on the people that work with our software and have served them day in, day out, every month and every year for over 30 years.

Dr. Fister GmbH.

Company Portrait

Steel, a versatile material, is flexible, hard, stainless, long-lasting, environmentally-friendly, recyclable, among many other characteristics.

Our customers are just as versatile as this material, whether they have one press or multiple presses, small presses or large presses; whether they forge bars, plates, rings or any free shaped pieces; whether they forge carbon tool steel, stainless steel, titanium or any other steel grade.

Although our customers are as diverse as their requirements for our forging software, each of them works with one solution: easy2forge – The Open-Die Forging Software.

To understand our customers means having comprehensive knowledge about the materials they use as well as their working sequence. Our philosophy is to focus 100% on our customer's demands. It is a known fact that you can profit the most from custom-tailored software; only by using customized software can you save money every day. We adapt to your requirements and not vice versa.

Since the establishment of Dr. Fister GmbH in 1989, our company has dealt exclusively with the development of software for the steel industry and steel wholesale business. By focusing on steel (industrial and wholesale) we hold an unrivaled expertise in the market – this is our unique selling point.

No other competitor has comparable know-how in the steel business. We speak your language and understand your concerns.



Information Technology is a fast-paced business in which there are always new trends and ideas. The market and its requirements change rapidly. To be able to provide software in these conditions for over 30 years speaks in our favor. We still have satisfied customers that have been working with us since the beginning — further proof of Dr. Fister GmbH's unique expertise and the trust our customers place in us.



Supporting our customers worldwide means frequent travel activities. Since 2019, Dr. Fister GmbH has been located in the Office Park of the Düsseldorf International Airport, which is the best environment today for the requirements of tomorrow. Come and visit us!

Today we provide a wide spread of tailored solutions on the basis of software packages or consulting. Up to ten people currently work together at Dr. Fister GmbH to implement projects successfully worldwide. Our Software solutions are used in Austria, China, Germany, France, India, Korea, Netherlands and the USA.



Reference list Steel industry

120 tons of red-hot steel. A press force of 9,000 tons. The open die press deforms the ingot with ease. Each movement of the manipulator and the press is exactly pre-calculated and executed with highest precision. Maximum performance, with perfect software from Dr. Fister GmbH. Worldwide. Unique. Successful.

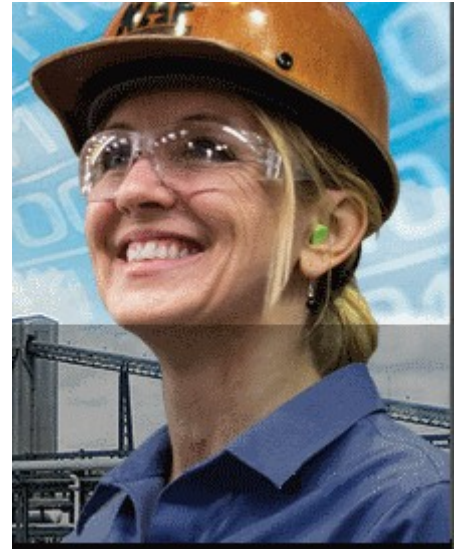
References

2010 Hunan Goldsky <i>Changsha, China</i>	40 MN <i>Siempelkamp</i>	2011 Dongbei Special Steel <i>Dalian, China</i>	35 MN <i>Siempelkamp</i>
2012 Fushun Special Steel <i>Fushun, China</i>	32 MN <i>Siempelkamp</i>	2012 L & T Special Steel <i>Surat, India</i>	70 MN <i>NKMZ</i>
2012 UKAD <i>Les Ancizes, France</i>	45 MN <i>Siempelkamp</i>	2013 Areva <i>Le Creusot, France</i>	95 MN <i>TS Plzeň</i>
2015 CHW Forge <i>Uttar Pradesh, India</i>	31.5 MN <i>Wepuko</i>	2016 l'union des forgerons <i>Méréville, France</i>	30 MN <i>Siempelkamp</i>
2018 Böhler Schmiedetechnik <i>Kapfenberg, Austria</i>	16 MN <i>Siempelkamp</i>	2019 Ellwood City Forge <i>Ellwood City, PA, USA</i>	15 MN <i>Demag</i>
2019 Ellwood Mill Products <i>New Castle, PA, USA</i>	50 MN <i>Danieli</i>	2020 Asil Çelik <i>Bursa, Turkey</i>	40 MN <i>HBE</i>
2020 CAF <i>Beasain, Spain</i>	6 MN <i>Wagner</i>	2020 Longda <i>Jiangsu, China</i>	40 MN <i>Siempelkamp</i>
2021 Ellwood National Forge <i>Corry, PA, USA</i>	20 MN <i>Bliss</i>	2022 Böhler Edelstahl <i>Kapfenberg, Austria</i>	44 MN <i>SMS</i>
2022 FRISA Forge <i>Garcia, Mexico</i>	30 MN + 50 MN <i>HBE</i>	2022 Fushun Special Steel <i>Fushun, China</i>	60 MN <i>Siempelkamp</i>
2022 NAF <i>New Castle, PA, USA</i>	90 MN <i>Danieli</i>	2022 Zollern <i>Sigmaringendorf, Germany</i>	8 MN <i>Lasco</i>



Testimonial

"Tobias did an outstanding job working with our press crew and maintenance team to help us implement a more automated process resulting in significant cycle time reduction and reduced process variation. We quickly recognized the benefits this automation will have on the overall maintenance of our equipment as well. His insight and interactions with the press operators was highly impactful and we look forward to continued partnership on future projects."



Judy Shaffer – Director of Quality – Ellwood City Forge Group

Steel wholesale

Every day, 100 tons of steel have to be moved from stock, loaded onto trucks and unloaded again. In the order transaction department, 20 new orders are recorded hourly at each workstation. All necessary papers must either be printed out at the right printer at the right time or be sent via fax or e-mail. The sales department receives an overview of the inventory, turnover and quantity. All data must be available at the push of a button.

Maximum performance, with perfect software from Dr. Fister GmbH.

Worldwide. Unique. Successful.



Made in Germany

For many years, "Made in Germany" was a seal that set the benchmark for quality all over the world. Today, computer scientists everywhere develop software for all kinds of applications. Finding a software engineer is easy, but finding a software engineer who understands your steel business is still a challenge. We develop software where our customers are; we come to you and listen. We solve your requirements with our know how: made in Germany.

Reliability / Processing Speed

Our applications have been running for many years without difficulty; they are fast and reliable. Databases that store up to 15 years of records (without deletion) are no rarity. Off times are unknown to us.

For this reason, our customers stay connected with us for a long period of time. We are not interested in the highest number of installations. We are interested in the longest lasting customer relationship. We are not satisfied until the customer is satisfied.

Support

The selection of a software provider is only one side of the story. Even more important is the question of support — this should be guaranteed for a long period. We will not leave you out in the rain once the installation and training phases are finished. We are also available for you when other people call it a day. We don't have a call center where you have to spent hours on hold. Challenge us! We are happy to serve you.



Cooperation Partners

Our Open-Die Forging Software is not a stand-alone system, nor is it a one-way solution. In order to get the most out of the application, we integrate it into your processes and systems. This creates a direct link to all leading suppliers in the forging business. Furthermore, the following suppliers trust in our system and cooperate with us.

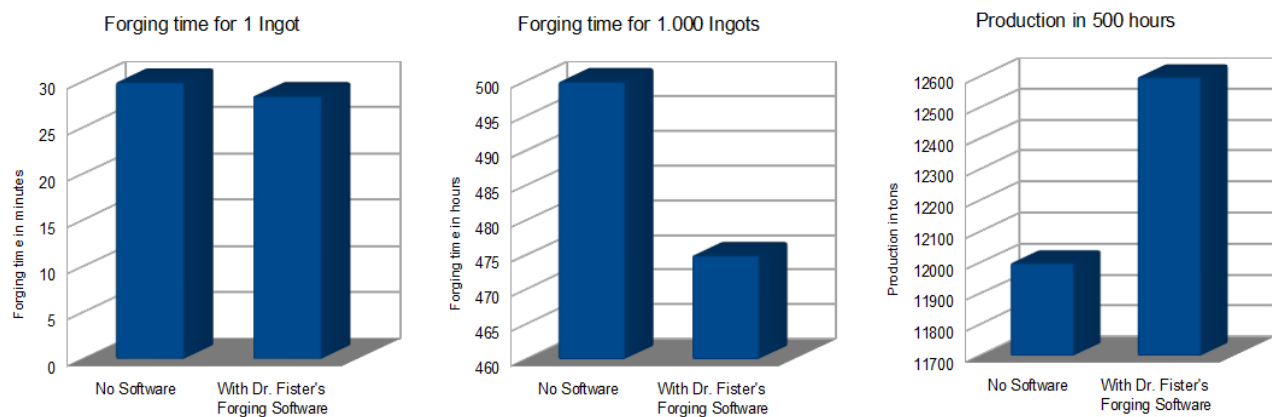
No matter where you buy your forging equipment, Dr. Fister GmbH will supply the software for programmed forging.



The Forging Experiment

It is no secret that every machine that runs in automatic mode is more efficient than a machine that runs in manual or semi-automatic mode. But what is the difference between both modes when looking at an open die forging press?

In order to prove the efficiency of the Open-Die Forging Software, we conducted an experiment in a German forge shop. During this experiment, we took a 12 ton ingot of the German steel grade 1.6587 and forged it from 1,000 mm down to 565 mm. We measured the time needed to forge this ingot in manual or semi-automatic mode and compared it with the time needed in fully automatic mode with pass schedules that were calculated with the Open-Die Forging Software. Here are the results:



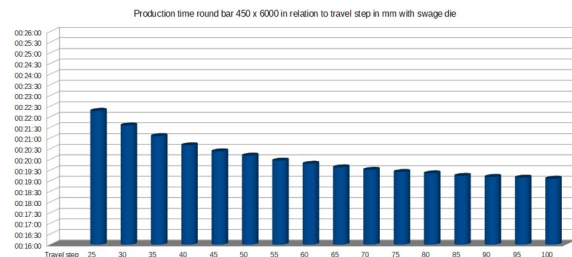
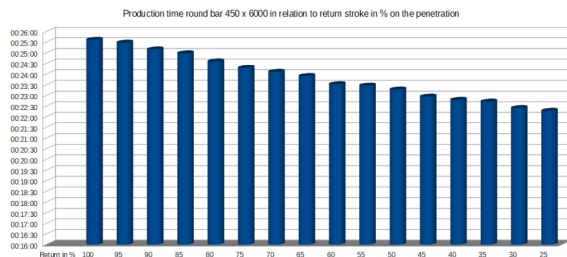
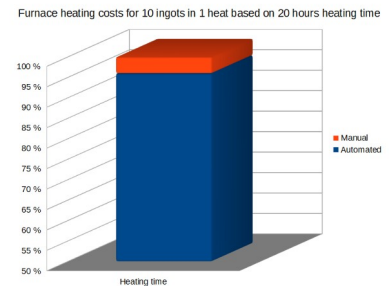
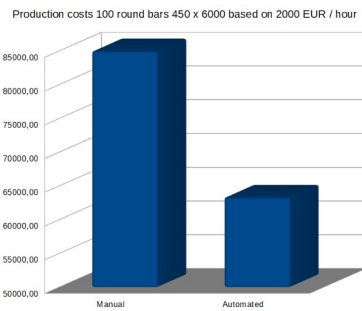
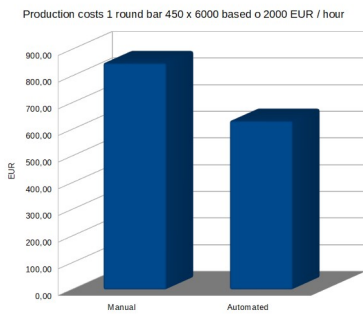
Conclusion

With the implementation of Dr. Fister's Open-Die Forging Software, our customer can save at least 1.5 minutes per ingot. By saving 1.5 min/ingot, our customer can substantially increase the yearly output capacity while still saving money. In other words: the implementation of the software increased the efficiency significantly. The return on investment will be less than 1 year.



Benefits of automation

There are a lot of aspects when optimizing your forging process using the easy2forge software. Look at some examples

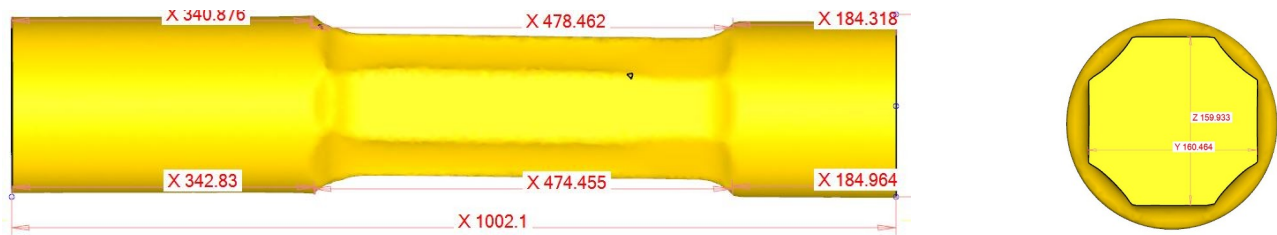


- ✓ Optimization of initiate and return stroke
- ✓ Optimization of travel step and rotation, especially for swage dies
- ✓ Forging in dual mani mode in both directions towards and away from the press
- ✓ Optimization of penetration = reducing number of passes
- ✓ Optimization of peel heights
- ✓ Use of measuring passes
- ✓ Reduction of maintenance costs
- ✓ Easy operation for the operators; easy to learn for new operators
- ✓ Less tolerances, better quality



Quality Aspects

Efficiency is not the only important thing in the forging business. You also have to keep an eye on the quality of the product. This not only applies to a single forged piece but also to a series of products that must be forged the same way repeatedly. We proofed the correctness of easy2forge calculation also with simulation software for material flow.



Our Open-Die Forging Software offers a variety of functions that deal with quality, namely:

- ✓ Consideration of the minimum reduction as well as the area of the forged piece for the selection of an ingot
- ✓ Automatic generation of an upsetting operation if necessary
- ✓ Consideration of deformation, penetration and minimum forging temperature as functions of the material grade
- ✓ Optional increased penetration for some passes to improve centerline consolidation
- ✓ Possibility for an interface to simulation software; e.g. Simufact, Deform, Forge
- ✓ Optimized manipulator step as a function of the selected die, current penetration and depth of the forge piece
- ✓ Consideration of the maximum forging time for some tools (e.g. mandrels)
- ✓ Automatic passes to round corners for high alloyed material
- ✓ Automatic calculation of the number of heats



Material and Energy savings

When considering efficiency, keep in mind that it is not only the efficiency of the press that matters. By optimizing your forging process, you will also benefit from reduced ingot weights and/or reduce the energy required by the furnaces.

Our Open-Die Forging Software means:

- ✓ Higher efficiency leads to higher furnace load and reduced energy costs per ingot
- ✓ Higher efficiency reduces the number of heats
- ✓ Fewer number of heats reduce energy costs
- ✓ Lower number of heats reduce the material costs due to less scale
- ✓ Optimized ingot selection can reduce material costs



Easy2forge - Highlights

The Open-Die Forging Software is the result of over 30 years of experience. With each new project, we add new functionality to the system to ensure it meets your needs. This also guarantees that you will purchase a state of the art system.

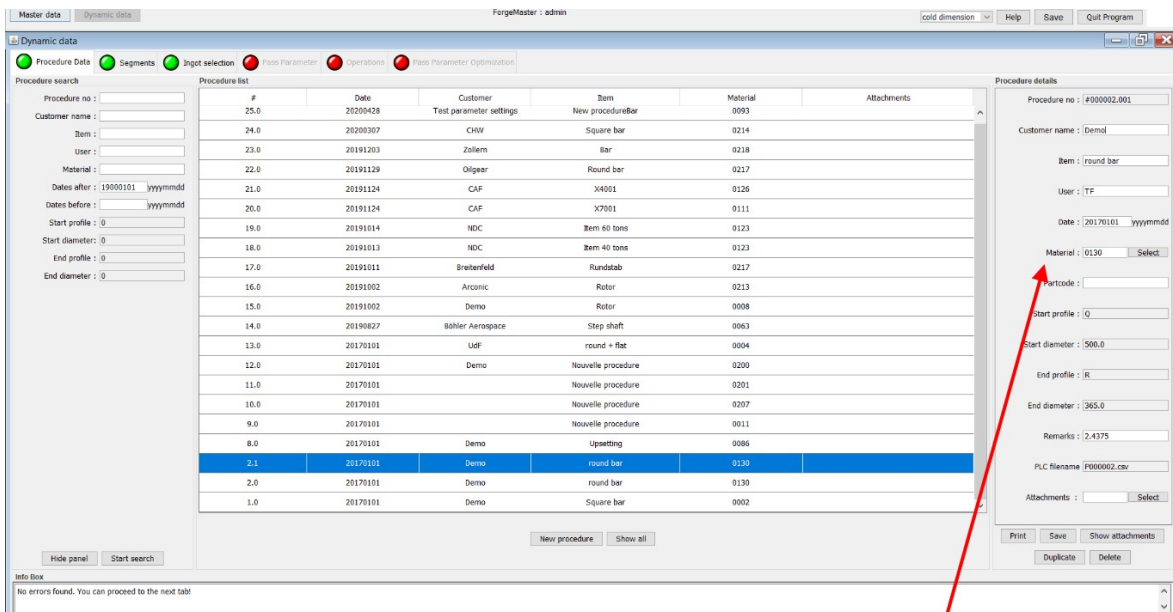
In addition to the functionality, we also attach importance to an optimized user interface. You can use the software effortlessly — the same way you conduct your forging business.

Take a look and form your own impression!

Manage calculated procedures

All calculated forging procedures are stored in a database from which you can retrieve them whenever you needed.

Additionally, the software includes a database of approximately 120 steel grades / "families", enabling flow stress calculation in accordance with the law of Hensel and Spittel. This information is necessary for the calculation of the required press force and press speed (strokes per minute).



mandatory field; selected from the material table

Enter final part dimensions

You can calculate any kind of workpiece just by entering the dimensions segment by segment. There are no limits to the shape; we offer all possible profiles including round, octagonal, square, flat and hollow pieces. You can even combine different profiles in a single forged piece.

No.	Profile	Attribute	Diameter/Thickness	Diameter Broken Corner	Depth	Diameter Right	Depth Right	Diameter Inner	Length	Weight	NF
1	flat	extramaterial	999	0.0	1210	0.0	0.0	0.0	50	0.0	<input type="checkbox"/>
2	flat	normal	999	0.0	1210	0.0	0.0	0.0	2190	20987.0	<input type="checkbox"/>
3	round	normal	1210	0.0	0.0	0.0	0.0	0.0	2090	19226.0	<input type="checkbox"/>
4	round	extramaterial	1210	0.0	0.0	0.0	0.0	0.0	50	0.0	<input type="checkbox"/>

Tool radius: 0.000

All dimensions in mm, length for extramaterial in %

Total weight: 40.213

Free form (activate for multiple segments)

ADD DELETE

2D front 2D top

Main: first grip first segment
 Main: first grip last segment
 Ingot head at first segment
 Ingot head at last segment

Info Box
No errors found. You can proceed to the next tab!

The visualization can be zoomed and rotated

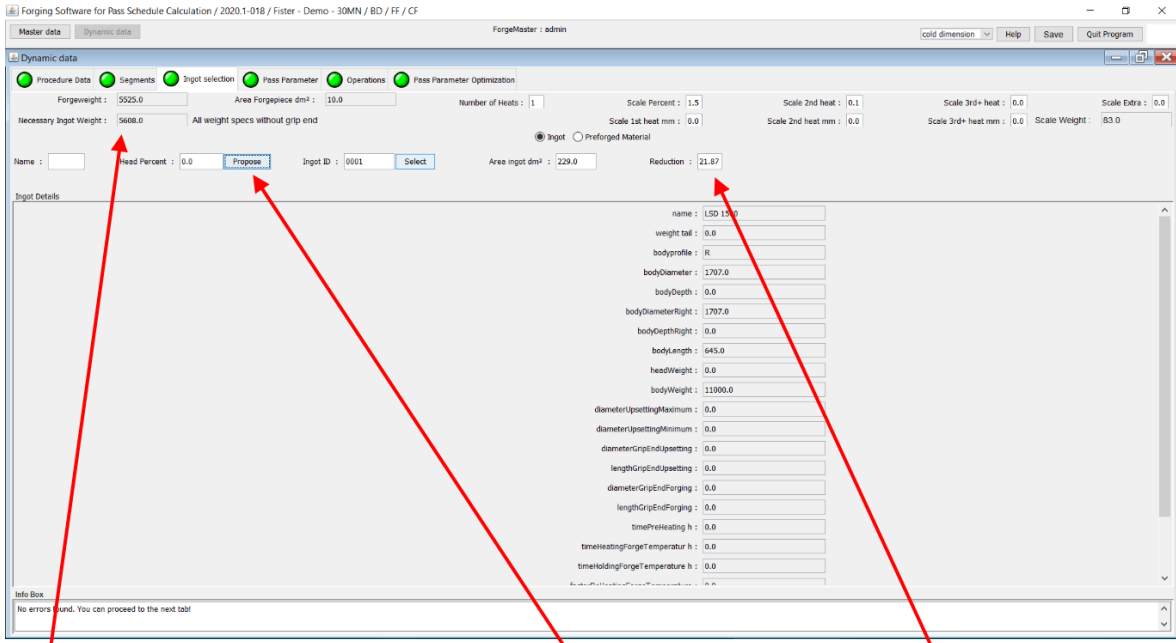
flat segment

round segment

The weight of each segment is automatically calculated for all segments with the attribute "normal"

Select or enter ingot data

Once you enter the final part dimensions into the software, the system calculates the necessary forge weight by taking into account that there will be scale due to the heats. You can either enter an ingot manually or pick an ingot from the ingot table that is stored in the database. The most efficient way is to let the system propose the optimal ingot from the ingot table. In doing so, the system considers the body weight, the area and the reduction of the ingot.



The minimum ingot weight in kg that will be needed for the forge piece
 Necessary ingot weight = Forgeweight + Scale Percent per heat

You can enter a minimum reduction you want to achieve with the ingot
 This value will automatically be adjusted after you have chosen for an ingot

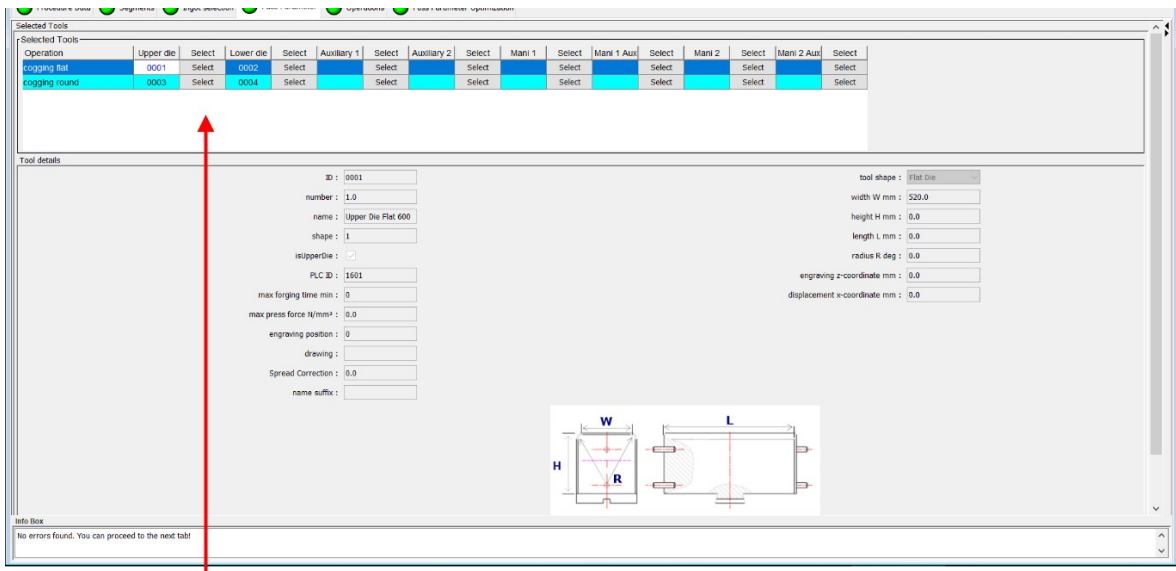
Press this button if you want the software to propose for an ideal ingot for your forge piece. The system will choose for an ingot according to the following rules

- reduction >= selected minimum reduction
- area of the ingot >= area of the forge piece
- percentage head material >= selected percentage head material
- body weight >= necessary forge weight

If no appropriate ingot can be found from the ingot list, the software will recursively retry to look for an ingot skipping one of the above mentioned rules beginning with the first rule

Optimize tool data

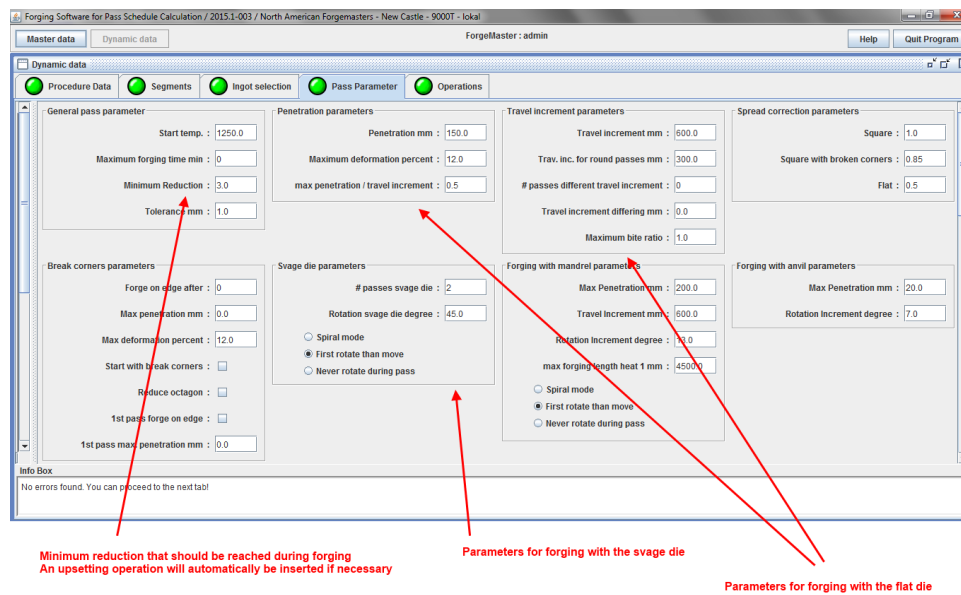
After selecting the ingot, enter the necessary tools for the forging process. Depending on the workpiece and the forging procedure, you can choose from a pair of flat dies, swage dies, v-dies and mandrels. There are some validity checks implemented in the pass schedule calculation. Selecting a tool will limit the maximum manipulator step, for example.



Select the appropriate tools for the different forging operations that you have to perform in order to get the given forge piece.
 Your standard tools will be pre-selected.

Optimize pass parameters

Modify the pass parameters (e.g. max penetration, max manipulator step, etc.) to speed up the forging process. During the software implementation, all pass parameters will be optimized upon approval from the customer. Some parameters are material dependent; these will be provided in the material table. This means that the parameters normally do not have to be changed for standard forgings. Nevertheless, for special forgings you are able to modify the parameters according to the requirements.



During setting into operation of the software all pass parameters will be optimized after clearance with the customer
Some parameters are material-dependent; their values will be taken from the material-table
This means that normally the parameters do not have to be changed for standard forgings
Nevertheless you are able to modify the parameters according to your needs for special forgings

Check and modify the forge schedule

The Open-Die Forging Software will automatically calculate a sequence of operations that are necessary to get the desired forge piece. This forging sequence will include operations like "Get material", "Heating in the furnace", "Upsetting", "Forging with flat dies", "Turn ingot", "Forging with swage dies" and so on. The automatically calculated forging sequence will consider the dimensions of the segments, the profiles of the segments, the necessary reduction of the forge piece, the temperature of the forge piece, etc. You are able to modify the calculated schedules manually afterwards if necessary.

Forging Software for Pass Schedule Calculation / 2015.1-003 / North American Forgemasters - New Castle - 900T - lokal

ForgeMaster: admin

Dynamic data

Procedure Data Segments Ingot selection Pass Parameter Operations

No.	Operation	Reduction	SR	SF	ST	Profile	Diameter	Dia Corner	Depth	Dia Right	Depth Right	Dia Inner	Length	L total	Temp End	Prod time	Idle time	Remarks	UD	LD	T1	T2
1	get material	0.0	0	0	0	cone (roun...	1795.0	0.0	0.0	1886.0	0.0	0.0	2421.0	2421.0	20.0	00:00:00	00:00:00					
2	back to furnace	0.0	0	0	0		0.0	0.0	0.0	0.0	0.0	0.0	2372.0	1213.0	00:00:00	00:00:00						
3	find and set zero	0.0	0	0	0		0.0	0.0	0.0	0.0	0.0	0.0	2372.0	1205.0	00:01:00	00:00:00						
4	equalize taper	0.0	2	1	4	octagon	1705.0	0.0	0.0	0.0	0.0	0.0	2496.0	2496.0	1166.0	00:00:00	00:05:00	0001 0002				
5	upsetting	0.0	2	1	4	round	2139.0	0.0	0.0	0.0	0.0	0.0	1672.0	1672.0	1150.0	00:00:43	00:00:00					
6	back to furnace	0.0	0	0	0		0.0	0.0	0.0	0.0	0.0	0.0	1638.0	1174.0	00:00:00	00:05:00						
7	find and set zero	0.0	0	0	0		0.0	0.0	0.0	0.0	0.0	0.0	1638.0	1160.0	00:01:00	00:00:00						
8	cogging flat	2.45	2	1	4	square	1210.0	0.0	1211.0	0.0	0.0	0.0	4104.0	4104.0	1086.0	00:12:59	00:00:00					
9	cogging flat	3.0	2	1	2	flat	990.0	0.0	1210.0	0.0	0.0	0.0	2601.0	4577.0	1072.0	00:02:00	00:00:00	0001 0002				
10	cogging flat	3.08	4	3	4	double-oct...	1210.0	0.0	1210.0	0.0	0.0	0.0	2483.0	5084.0	1050.0	00:04:01	00:00:00	0001 0002				
11	change die	0.0	0	0	0		0.0	0.0	0.0	0.0	0.0	0.0	4983.0	1046.0	00:00:00	00:00:00	0003 0004					
12	cogging round	3.13	3	3	4	round	1210.0	0.0	1210.0	0.0	0.0	0.0	2516.0	5117.0	1035.0	00:02:37	00:00:00	0003 0004				

Productive Time 00:24:20 Idle Time 00:15:00 Total Time 00:39:20

Info Box
Dimension check: some segments have a profile or dimensions that are different from what is given on the segments tab, please check the drawing of the final forging operation to verify.

- Generate a new forging sequence. The operations will be calculated according to the following rules
- for every segment there will be a forging operation with flat dies;
 - the forging operations will start with the biggest segment (in diameter) down to the smallest segment (in diameter)
 - the forging will start with the segments that are opposite to the manipulator (if you have one manipulator)
 - for every round segment there will be a forging operation with the svage die
 - if the reduction of the ingot is smaller than the given value in the pass parameters tab there will automatically be inserted an upsetting operation in order to reach the given reduction
 - for hollow forge pieces there will firstly be forging operations in order to reach the given reduction; after that there will be forging operations in order to expand the ring
 - when the forging temperature drops beneath the minimum temperature given in the material data table there will automatically be inserted a new heat

See the pass schedules

For every forging operation, the Open-Die Forging Software calculates the pass schedules that can be downloaded into the press controls. The pass schedule shows all of the important information for the forging process: press force, number of strokes, manipulator step, dimensions, etc. For each pass schedule, the software calculates the total forging time and the final temperature.

The pass schedule is calculated according to the law of Tomlinson and Stringer and includes some optimizations based on our experience.

Forging Software for Pass Schedule Calculation / 2015.1-003 / North American Forgemasters - New Castle - 900T - lokal

ForgeMaster: admin

Dynamic data

Procedure Data Segments Ingot selection Pass Parameter Operations

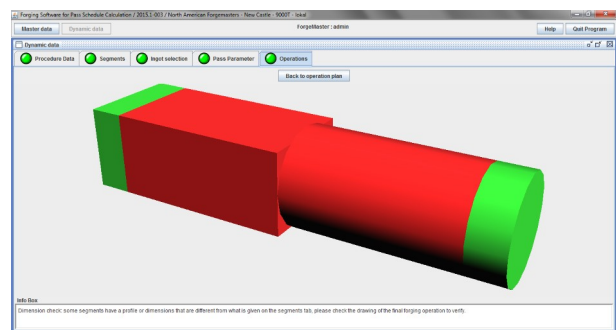
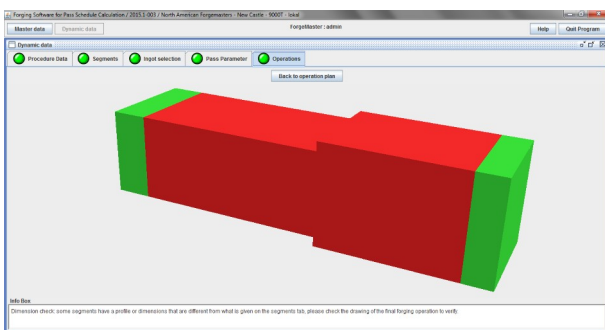
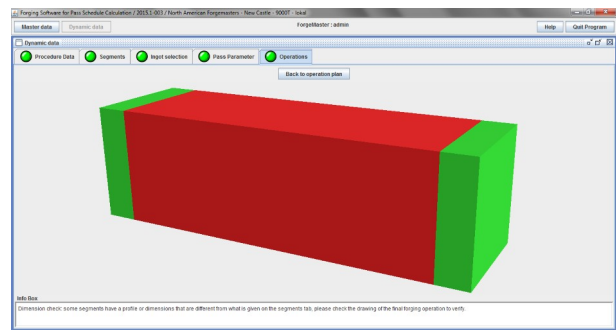
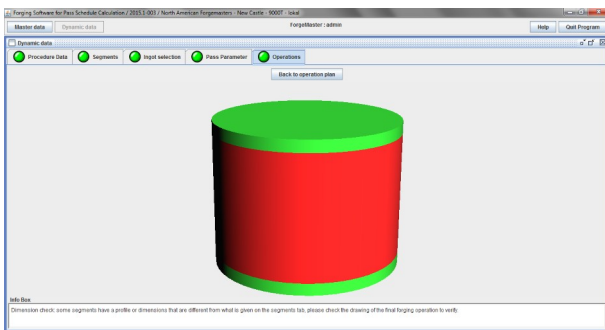
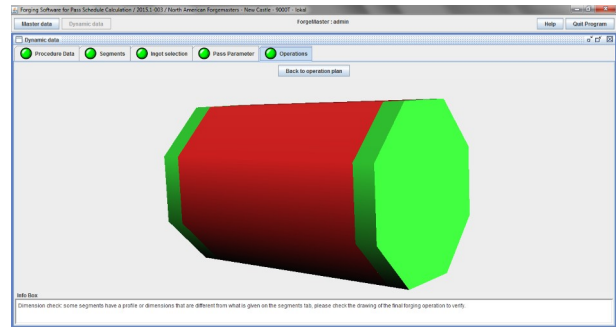
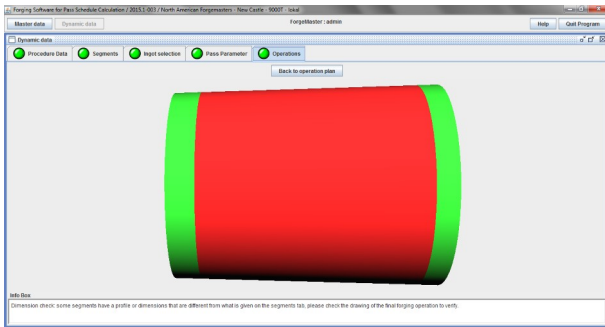
Back to operation plan

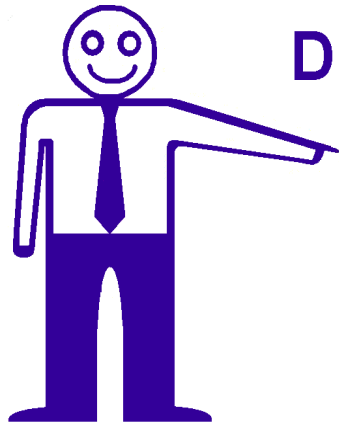
No.	ProfileStart	DiameterStart	DepthStart	ProfileEnd	DiameterEnd	DepthEnd	LengthEnd	Penetration	TravelIncrement	Rotation	PressForce	StrokesPerMinute	Strokes	TemperatureEnd	Time
1	R	2139.0	2139.0	F	1989.0	2139.0	1672.0	150.0	520.0	0.0	29.9	14	4	1156.0	00:00:32
2	F	2139.0	1989.0	Q	2016.0	2016.0	1672.0	123.0	520.0	90.0	27.5	15	4	1153.0	00:00:31
3	Q	2139.0	2016.0	F	1866.0	2052.0	1672.0	150.0	520.0	90.0	32.9	14	4	1150.0	00:00:32
4	F	2139.0	1866.0	Q	1900.0	1900.0	1672.0	152.0	520.0	90.0	29.9	14	4	1147.0	00:00:32
5	Q	2139.0	1900.0	F	1750.0	1937.0	1772.0	150.0	520.0	90.0	34.0	14	4	1144.0	00:00:32
6	F	2139.0	1750.0	Q	1785.0	1785.0	1888.0	152.0	520.0	90.0	30.9	14	4	1141.0	00:00:32
7	Q	2139.0	1785.0	F	1635.0	1823.0	2016.0	150.0	520.0	90.0	34.5	13	4	1138.0	00:00:33
8	F	2139.0	1635.0	Q	1671.0	1671.0	2152.0	152.0	520.0	90.0	31.3	13	5	1134.0	00:00:38
9	Q	2139.0	1671.0	F	1521.0	1710.0	2310.0	150.0	520.0	90.0	34.7	13	5	1131.0	00:00:38
10	F	2139.0	1521.0	Q	1558.0	1558.0	2475.0	152.0	520.0	90.0	31.3	13	5	1128.0	00:00:38
11	Q	2139.0	1558.0	F	1408.0	1599.0	2669.0	150.0	520.0	90.0	34.5	13	6	1124.0	00:00:42
12	F	2139.0	1408.0	Q	1446.0	1446.0	2873.0	153.0	520.0	90.0	31.0	13	6	1120.0	00:00:42
13	Q	2139.0	1446.0	F	1296.0	1488.0	3116.0	150.0	520.0	90.0	34.2	13	6	1116.0	00:00:42

Info Box
Dimension check: some segments have a profile or dimensions that are different from what is given on the segments tab, please check the drawing of the final forging operation to verify.

Simulate the forging process

The whole forging process can be simulated in 3D. You can rotate the forge piece, and you can even zoom in and out. This makes complicated forging steps descriptive and comprehensible.





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