

## Does Preactor simulate?

Well the straight answer to this yes of course it does and in fact when it uses the SBS engine it does very similar things to what a traditional discrete event simulator does with a number of important differences.

A traditional simulation tool uses events to advance a simulation model. Thus all events that 'do' something (e.g. free a resource, free a resource, arrival of an order) are processed at that time, then time is moved forward until the next event occurs. A traditional simulation tool will use queues of work from which it will select the next job to load based on a dispatching rule (e.g. minimize changeover time, critical ratio). When all events have been processed the model ends.

A traditional simulation tool though will generally be interested in variance, i.e. what could happen, and will use distributions to represent process times and time between events and probability to determine whether possibility A happens rather than possibility B (e.g. the time between order arrivals has a distribution A, the probability of which type of product is B and the batch size a distribution C).

It will use random number streams to 'power' these probabilities and to select values from distributions. You would typically run the model 20 or more times with different random number streams to get the 'full picture' and you would use various tools to manipulate output data to get to a 'result' which will usually be some form of measure with a confidence interval. You then compare one result (X machines are available) with another (Y machines are available).

What are the disadvantages of using discrete event simulators for scheduling?

1. You can only schedule forwards in time. This means the ability to backward sequence or bi-directionally sequence is not possible.
2. The probabilities and distributions are not relevant to day to day scheduling. Just by changing the random number stream or even the start point within that stream would give a totally different schedule.
3. We have had some experience at using for example a SIMAN model as the scheduling engine. The method of modeling a factory for simulation as regards scheduling is totally different because of the way that resources are handled. It has to be resource orientated rather than entity orientated and this makes for some interesting problems not least of which is how to initialize a simulation model in order to get all the entities in the right place in simulated time. In many cases it is necessary to re-run the simulated model from the start of the schedule period (even past current time) then add the new entities that have not been scheduled. One approach to this by AutoSched is to have two models, one which mimics what the real plant and the other, when required to re-schedule would copy the model then move forward from there. Initialization of a simulation model can be a real problem.
4. Speed can be a problem for some tools. Though you can turn off the animation to speed the model up we certainly had this problem when using SIMAN.
5. The outputs from a simulation model are totally different than an operational tool needs. Gantt charts, work-to lists etc are the needs of the day to day tool while statistical information is the staple diet of a simulationist. And of course if you are allowed to drag and drop operations this is very difficult to do in a simulation tool and will totally invalidate any statistics that have been collected.

What are the advantages of Preactor?

1. Any sequence of loading operations can be automated. This includes job at a time, operation at a time, forward, backward and any which way. You can Product dependent sequencing rules, time dependent, resource dependent, and operation dependent.
2. You can update Preactor very quickly from other packages in ASCII file transfer using import/export scripts or by using VB (ActiveX).
3. The views of the production is 'made' for day to day use and reports tailored for production environments.

Can you use Preactor for long term scheduling to what if into the future?

Yes. This is what we are doing when we link Preactor to a Forecaster. The Forecasting software will generate the forecast orders maybe for a year and Preactor will then schedule it. You can add resources, take resources out. However we have no distributions or probabilities. This is called a deterministic model (as against a stochastic model).

Can a discrete event simulator and Preactor be used together?

Yes. At the Vienna Airport project they use a simulator to carry out long term what if analysis. It uses the same data as Preactor but uses distributions to vary the arrival time and departure times of flights to see the impact for example on the queues of passengers at check in counters.

Traditional discrete event simulators are off-line design tools.

Preactor is an on-line operational tool.

Both have their uses.

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