



There's no doubt that trading systems offer a powerful advantage in the markets, allowing traders to formulate their own set of trading rules designed to produce consistent profitability. However, before these rules can be put to use, traders must first get over one of the biggest trading stumbling blocks, creating the optimal sizing and timing of stop-loss orders. Here, William Akerman shows you how.

Every winning trader has a set of rules that must be satisfied before they enter a trade. In fact, the importance of having pre-defined trade criteria, either through non-mechanical or system-based trading, can never be overstated.

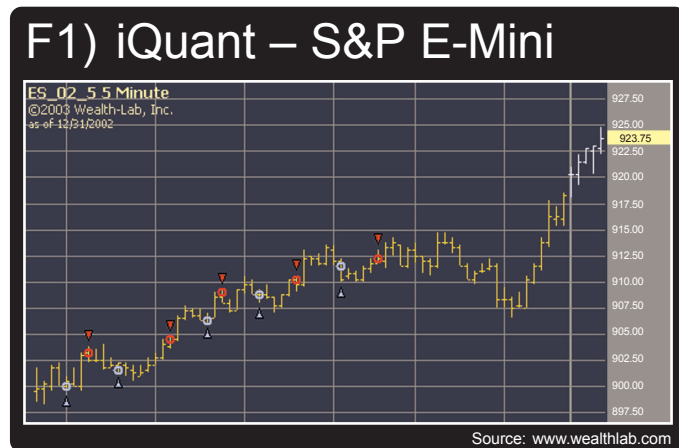
The creation of a system gives a trader a powerful advantage in the financial markets. Trading systems are based on techniques that offer definitive and measurable output, offering several major advantages. The ability to develop, test, measure and adjust a system gives a substantial edge that can consistently produce profit.

Trading systems must include core attributes that together form the foundation blocks upon which other system rules can be built. Probably the most important of all these foundation blocks is the sizing and timing of stop-loss orders. However, the determination process of a successful stop-loss mechanism is not as straightforward as that of other system criteria.

During a recent roundtable debate, there was some questioning as to whether disciplined trade length and size stops could alone produce consistent profitability when placed within a rule-based framework. It is an interesting topic for discussion, but there's no doubt that a well-positioned stop loss allows for a margin of error on the trade entry level, enabling maximum profit capture, while

avoiding the scenario of being stopped out too soon.

Varying stop-loss criteria greatly impacts both profitability and trade risk. Furthermore, varying risk tolerance (a financial stop), in conjunction with trade length (a time-based stop), provides a robust and consistently profitable element to any system.



T1) iQuant – results

	All Trades	Long Trades	Short Trades	Buy & Hold
Net Profit	\$25,012.50	\$9,787.50	\$15,225.00	\$-13,662.50
Profit per Bar	\$3.63	\$2.99	\$4.21	\$-0.67
All Trades	910	417	493	1
Avg Profit/Loss	\$27.49	\$23.47	\$30.88	\$-13,662.50
Avg Profit Loss %	0.06%	0.05%	0.06%	-23.69%
Avg Bars Held	7.57	7.85	7.33	20,288.00
Winning Trades	593 (65.16%)	268 (64.27%)	325 (65.92%)	0
Gross Profit	\$74,612.50	\$32,675.00	\$41,937.50	\$0.00
Avg Profit	\$125.82	\$121.92	\$129.04	\$0.00
Avg Profit %	0.26%	0.25%	0.27%	0.00%
Avg Bars Held	5.64	5.73	5.56	0.00
Max Consecutive	12	17	15	0
Losing Trades	317 (34.84%)	149 (35.73%)	168 (34.08%)	1
Gross Loss	\$-49,600.00	\$-22,887.50	\$-26,712.50	\$-13,662.50
Avg Loss	\$-156.47	\$-153.61	\$-159.00	\$-13,662.50
Avg Loss %	-0.35%	-0.33%	-0.36%	-23.69%
Avg Bars Held	10.68	11.15	10.26	20,288.00
Max Consecutive	5	5	5	1
Max DrawDown	\$-2,450.00	\$-1,587.50	\$-2,312.50	\$-20,737.50
Recovery Factor	10.21	6.17	6.58	0.66
Profit Factor	1.50	1.43	1.57	N/A
Payoff Ratio	0.75	0.75	0.74	N/A
Standard Error	\$1,167.69	\$787.24	\$778.57	\$2,705.50
Risk Reward Ratio	0.28	0.16	0.25	-0.08
Sharpe Ratio of Trades	17.50	16.18	18.60	N/A

Source: www.wealthlab.com

Determining an effective stop-loss and trade length mechanism

As briefly mentioned, a winning trader recognises that a successful stop-loss strategy must be based upon the optimal trade length, combined with size. However, for this to strategy to work well the trader must include these parameters in a measurable and systematic way. By starting with a simple system the trader has the ability to measure the profitability impact of the criteria under examination, in this case stop loss and trade length.

In the example below it is possible to test a varying stop-loss size, followed by varying trade length, and the *combination* that offers the most consistently profitable output. The combined result is most effectively analysed by overlaying the first two data sets.

In order to carry out such analysis, a trader must start with a skeletal trading system. Examples below are based on S&P 500 trading system iQuant, stripped back to a point where no stop-loss criteria are included. The simple rules of this system are below.

iQuant – an existing trading system

iQuant is a short-term trading tool for the E-Mini (S&P 500). The system works on five-minute bars and utilises a simple logic

that identifies developing intra-day trends. Once it has established the presence of a trend, it waits for a pullback defined as a low risk trade entry point, anticipating a resumption of the trend in the original direction.

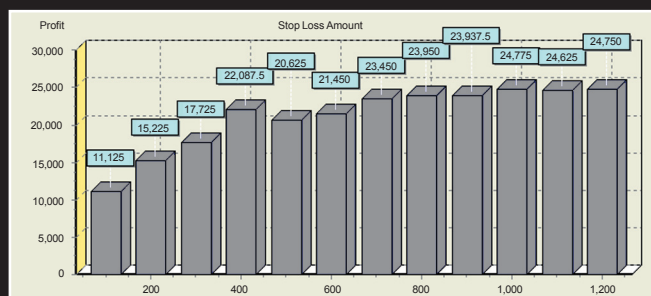
Once an open position is established, an exit is signalled either by a new entry signal in the opposite direction, or by a closing bar exhibiting strength relative to the preceding bars. The system trades actively and generates about three round-turn trades each session.

NB: there are no position management stops in the system code at this point of analysis.

In figure 1, the blue arrows indicate a long trade entry, and the red arrows, a long trade exit. It clearly shows the presence of an upward trend, and as one would expect, the system takes positions each time prices pullback from the trend direction. The chart displays all long trades, but it should be noted that the system also takes initiating short trades.

The system performance results, based on trading a single S&P 500 E-Mini contract and without any allowance for costs, are shown in table 1. The test is over one year of five-minute E-Mini data for 2002. Data is for day sessions only and back-adjusted

F2) iQuant profits – different stop-loss amounts



for the rollover spread from one contract month to the next. The rollover was undertaken on volume basis.

Stop loss size

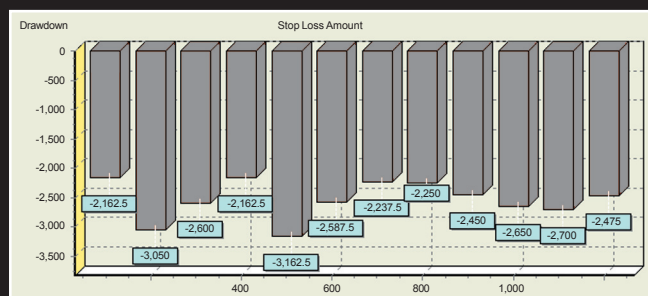
As discussed, at this stage the system contains no money management stop loss. In order to develop a stop-loss strategy, the first stage is to test and implement a varying stop-loss size. The most effective method of evaluating the inclusion of a stop-loss sizing element is to run a simulation of the system with varying stop-loss sizes, comparing the results.

By adding a simple stop, based on a fixed dollar loss per trade, a trader can undertake the first stage of analysis. Interestingly, many winning systems fall apart when a stop-loss strategy is added, indicating the overall weakness of that particular system's strategy. This is usually an indication that the system is subject to large drawdowns or profit and loss swings in relation to profits.

The logic behind the inclusion of the stop loss in this example is not to increase profit, but to quantify and reduce risk. By having an ultimate stop, absolute risk is limited.

Figure 2 shows the results of the first stop-loss addition. The simulation demonstrates a stop-loss range set between \$100 and \$1,200. Clearly, the larger the stop-loss figure, the greater the profits, up to an amount of \$1,000, after which the results flatten out. This would indicate a suitable level to set the system stop

F3) iQuant drawdowns – different stop-loss amounts



loss. But what is the effect on the system drawdown by adding the new stop? Figure 3 shows the same system's drawdown results.

Figure 3 illustrates that the inclusion of a stop-loss element does not significantly impact the system performance. The average drawdown for all values of the stop is almost the same as for the system without any stop, i.e. \$2,400.

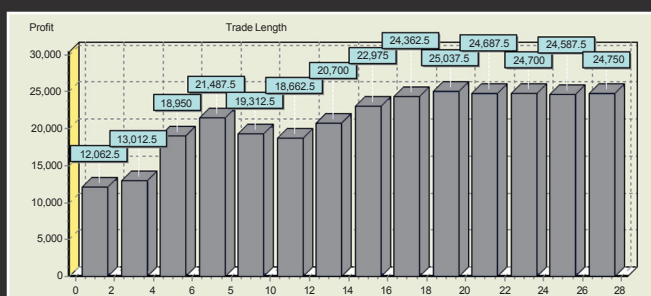
Armed with this positive set of results, a trader is now in position to embark on the second phase of stop-loss analysis – the examination and then overlay of a trade length or time-based stop loss.

Time-based stop

At this stage of development, the system has a pre-defined exit strategy, but what time period would be the most successful exit criteria? As displayed in figure 2, the average trade length is seven bars, but it may prove advantageous to hold trades for a different time period, maybe longer or shorter. For instance, if the trade remains unprofitable for a certain number of bars, there might be a reduced probability that the position will ever become a winner.

Another widely discussed issue is whether open positions that are currently profitable should be treated differently from unprofitable ones. One commonly used strategy is to let open

F4) iQuant profits – different trade lengths (in bars)



F5) iQuant profits – different trade lengths, losers only (in bars)

