Systematic Innovation

e-zine

Issue 23, December 2003

In this month's issue:

The Systematic Innovation e-zine is a monthly, subscription only, publication. Each month will feature articles and features aimed at advancing the state of the art in TRIZ and related problem solving methodologies.

Our guarantee to the subscriber is that the material featured in the e-zine will not be published elsewhere for a period of at least 6 months after a new issue is released.

Readers' comments and inputs are always welcome.
Send them to **darrell.mann@systematic-innovation.com**

The (Least) Ideal Final Result

Anyone familiar with TRIZ knows about the concept of the Ideal Final Result as a destination point towards which successful innovations are attracted. More experienced users will also be aware of the trend known as 'Mono-Bi-Poly (Increasing Differences)'. In this trend we see the emergence of an opposite function. The classic example is the pencil with the eraser fitted at the end. According to the trend, someone, somewhere will find a need for the opposite function.

By combining the Ideal Final Result (IFR) concept with this Mono-Bi-Poly (Increasing Differences) trend, we might come to the idea of a negative Ideal Final Result (-IFR), or least Ideal Final Result. The –IFR may thus be seen as the polar opposite of the IFR as shown in Figure 1.

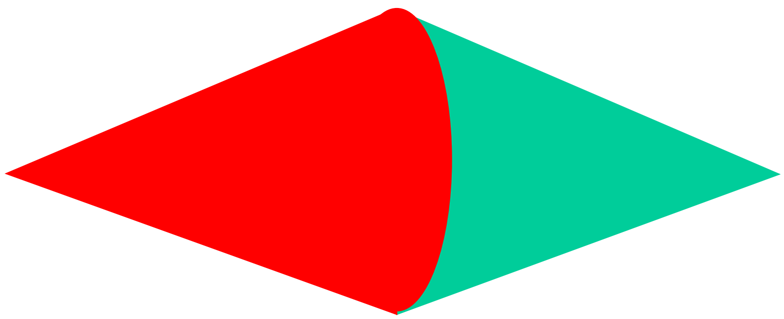


Figure 1: Ideal Final Result and Least Ideal Final Result

The characteristics of this negative IFR may be seen as all those attributes that we really don't want to find in a system – infinite cost, zero reliability, etc. Not much use at first sight, but actually very similar to an often extremely effective idea generating technique found outside of TRIZ.

'What would be the worst possible way to solve this problem?' is often used by creativity educators as a means of getting people to think out of the box. The technique also resognises that many people find it easier to engage the negative thinking aspects of their brain than the positive and generative parts. If you've not tried it before, an experiment you might like to make with a group sometime is to divide into two smaller groups and then get one to think about 'best' and the other 'worst' ways of solving a problem. At the very least, the number of ideas generated by the negative group will be significantly longer than that produced by the positive group. Very often, also, you will observe that the ultimate solution to the problem also emerges from the negative group. Not that anyone really wants to solve a problem in the 'worst possible way' – ultimately what we should be seeking to do is invert the 'worst' solution ideas into what might hopefully become 'best' ideas. The big point about going to the worst case first is that it forces you to get away from all of the psychological inertia associated with always being expected to think in the purely positive direction.

During a recent workshop, someone asked the question 'why do we always try to jump straight into solution mode when we are given a problem?' If you think about it, it nearly always happens; as soon as someone describes a problem to us, our immediate instinct is to start generating possible solutions. We think the answer to this is closely related to the above psychological inertia effect of always wanting to be heading in the positive direction. We are very often reluctant to challenge problem definitions because by doing so we might end up further away from a solution than when we started. Even if this ultimately turns out to be a good thing, at the time we are doing it, it can feel extremely uncomfortable. In many ways this effect is the same as the one that causes us to spend so little time (comparatively) planning an activity before we get stuck into the 'doing' part. When we are 'doing' we look busy, and we very easily trick ourselves into believing we are making progress. When we are 'planning' we often don't look like we're busy, and, more importantly, we feel that we are not making progress.

So, the 'what would be the worst way…?' prompt is a way of getting us out of this kind of psychological inertia rut.

In many senses, the Subversion Analysis part of TRIZ works using a very similar reverse-psychology basis – prompting users to actively invent failures ('what would you do to make this system fail'). Again, experience using the method demonstrates that many people are much more capable of dreaming up ways of making bad things happen than they are of producing generative ideas. The Size-Time-Interface-Cost psychological inertia tool is also very similar ('how would you solve the problem if you had zero money?' for example).

The 'what would be the worst way…?' technique is most commonly used as a light-hearted icebreaker type exercise. Its purpose in this role is very much to get people thinking out of the box. By taking the output from this kind of activity and re-inverting it, however, we can very often generate some very interesting new and useful ideas.

Example:-

Q. 'What would be the worst way to motivate students to learn?'
A. Tell them it won't be on the exam

Okay, an obvious one when we come to invert it, but what about:-

Q. 'What would be the worst way to motivate students to learn?'
A. Lecture at 9am.

Here's a negative solution direction that might enable us to generate some very interesting positive direction solution options.

The negative Ideal Final Result is very simply a way of adding a more specific focus to the whole concept of problem solving by first looking to the worst possible ways of doing things.

Seven And The Downward Spiral

We've all heard stories about how bad news seems to travel faster than good news; about how customers are much more likely to tell their friends about their bad experiences than their good ones; about in-company communications being corrupted by a negative minority. We've probably had direct experience of the phenomenon at some time or another. It seems to be another of those fundamental characteristics of the human brain. At least the evolved, modern-day version. This article tries to draw some sense from the phenomenon and tries to define ways of identifying when it is about to happen and what we might then be able to do to prevent the negative from turning into a self-re-enforcing downward spiral.

Special Cause/Common Cause?

One of the first things we need to do when thinking about self-re-enforcing spirals – whether they be upward or downward – is to think about common and special causes. The two terms were first used by W.E. Deming (Reference 1 gives the probably best description) when thinking about statistical process control and the desire to improve manufacturing systems. A common cause problem is one associated with the 'normal' functioning of a system, while a 'special' cause is typically a one-off event that by definition is not attributable to the 'normal' functioning of a system. Variation in sales of, say, greetings cards due to the changing seasons (Christmas, New Year, etc) may be seen to be 'common cause'. A lull in sales due to a postal strike on the other had, would represent a 'special cause' variation.

The point of mentioning special and common causes here is that most commonly, only the latter will result in the creation of spirals. When a system is disturbed in some way by a special cause perturbation, the most likely result –assuming the system is in control prior to the disturbance – is that after the perturbation has disappeared, the system will return to normal. Figure 1 presents two possible graphical representations of this special cause perturbation phenomenon.

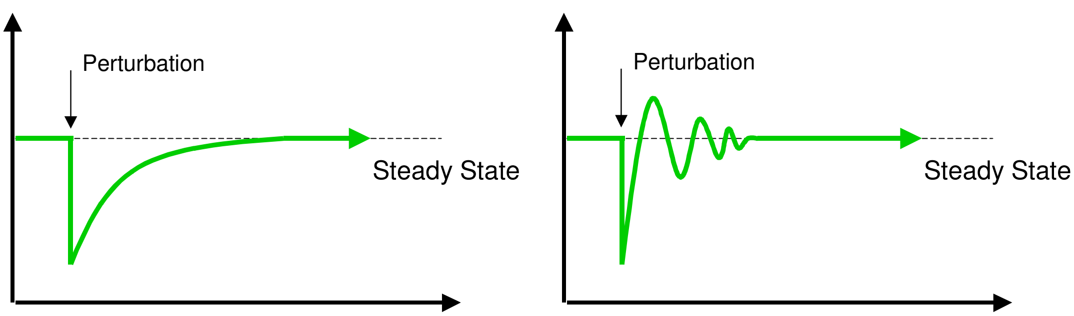


Figure 1: System Returning to Steady State Following a Special Cause Perturbation

In the left hand picture, we observe the system (green-line) gradually return to the steady-state following the perturbation. In the right hand picture, the return to steady-state is more oscillatory. The difference between the two pictures is indicative of the amount of damping in the system. The left-hand system may be said to be heavily damped, while the right hand picture shows the characteristics of a system with much less damping. The former may be seen to represent, for example, the recovery of the stock-market after a global incident. Here the damping comes from the large inertia of a large population of investors.

Smaller, more localized systems are less likely to have the same levels of inertia, and are thus more likely to exhibit the less damped behaviour shown in the right-hand picture. Neither of these two situations is of particular interest to us in the context of self-re-enforcing systems since both eventually return to the steady-state. There is a third kind of response to a special cause perturbation, however, that should be of interest. This third kind may be thought of as the 'un-damped' response to the perturbation. Graphically it will look something like the image shown in Figure 2.

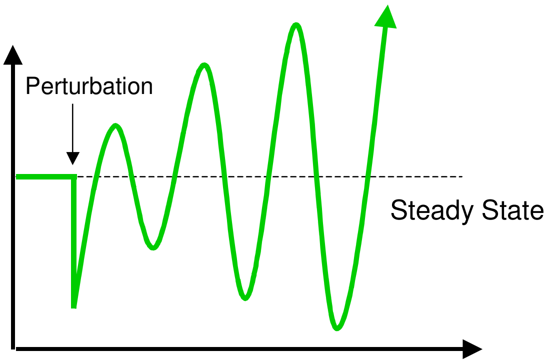


Figure 2: Undamped System After Perturbation

In this third system the oscillations following the perturbation become progressively bigger and bigger and the system swings more and more out of control. If left unchecked, this third response will ultimately destroy the system altogether. Conflicts very often result from this kind of un-damped system – a neighbour holds a noisy party without informing the people next door, which subsequently provokes them to submit a complaint to the police, which then results in the neighbours letting down the tyres on the complainants car, and so on until something really bad happens.

This kind of un-damped, oscillatory behaviour results from classic win-lose responses. If someone has kept you awake all night with their party, your first reaction is very often to seek some kind of revenge.

So, the situation where a special cause event is followed by win-lose reaction, which in turn is followed by a succession of tit-for-tat reactions can be (and often is) the source of downward spirals. In the next section, we examine common causes situations and see how spirals can (and often do) emerge from this type of situation too.

Self-Re-enforcing Loops?

One of the key contributions to the process of Function Analysis made by TRIZ was the incorporation of negative functional relationships – harmful, excessive, insufficient or missing elements. The recent re-framing of the method into a business and management context (Reference 2) has seen the additional segmentation of functional relationships into tangible and intangible elements. 'Intangible' in this case means all those relationships that are not traditionally written down in procedures – things like personal relationships, knowledge transfer, branding aspects, ego, etc.

The combined positive plus negative, tangible plus intangible method of constructing function analysis models gives four different types of relationship – positive tangible, positive intangible, negative tangible and negative intangible. A typical function analysis model produced from these parts might look something like that shown in Figure 3. Many of the relationships that would be present in the actual situation have been eliminated for clarity – in real life modeling of even this simple four element system can often result in function analysis maps with several dozen relationships of different sorts present.

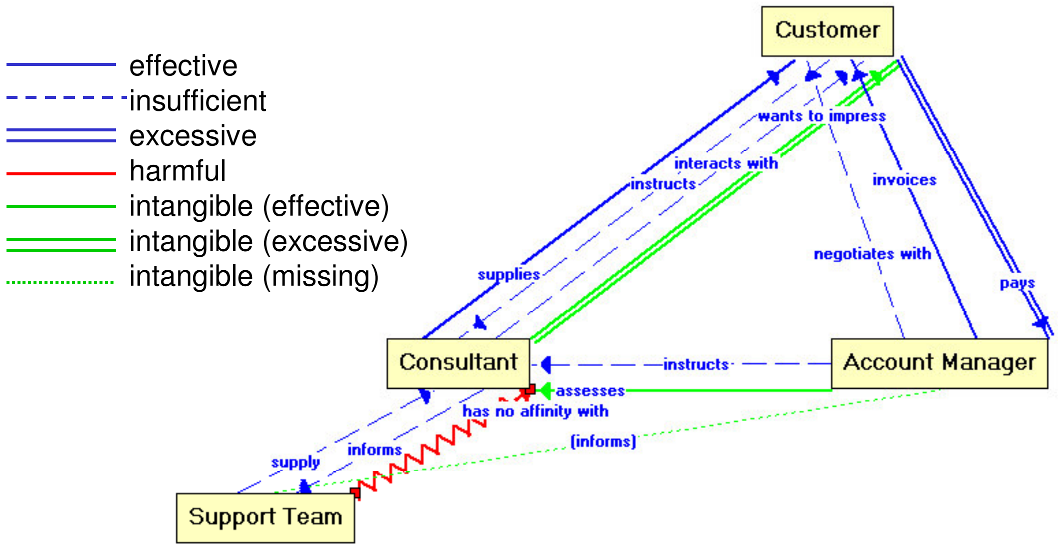


Figure 3: Function Analysis For A Typical People System

The idea behind function analysis models of this type is that they describe the steady state version of a system. True, the model may change as a function of time as the relationship between customer and consultant evolves, but essentially the model is intended to represent the system in its current 'normal' state.

If we now examine just a part of this system – say the part involved with internal relationships (Figure 4) – we may be able to identify loops containing a series of negative relationships. In this (admittedly hypothetical) case, we may see two particular negative sets of relationships involving loops – firstly a pair of insufficient relationships between the consultant and support team, and secondly a missing connection between account manager and support team that results in the absence of a working loop between the three different parts of the internal system.

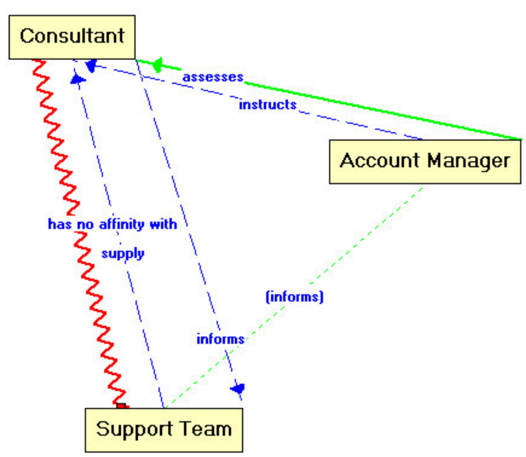


Figure 4: Partial Function Analysis Model Illustrating Negative Relationship Loops

The presence of either of these situations – or indeed any other form of negative loops or missing loops represents the potential for a self re-enforcing downward spiral. Similarly, loops which feature positive relationships represent the possibility of self-re-enforcing loops that are positive in nature.

Thus we see the function analysis model existing as a means of plotting relations between different parts of a system in its 'in control' normal state, and the idea that wherever there are loops of negative or positive relationships there exists the potential for self-re-enforcing loops to be created. The function analysis model, therefore, becomes a useful means of identifying the presence of either upward or downward spirals.

Seven?

One of the weaknesses of the function analysis method is that it is very difficult to provide a visual indication of the relative importances and weights of the different functional relationships. So, wherever we observe a combination of positive and negative relationships in a given loop, it is difficult to know which are more important than others. Or indeed whether there is the potential for the creation of the self-re-enforcing upward or downward spirals suggested by Figure 5 below.

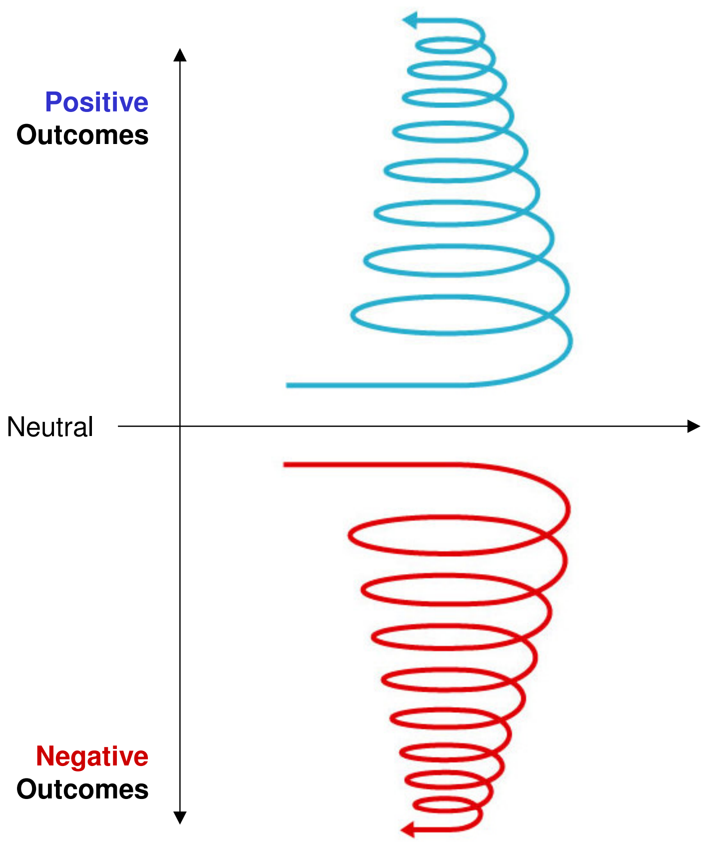


Figure 5: Virtuous and Destructive Loops

It is not clear at this time how or whether this shortcoming might be overcome. What we can say quite clearly from empirical evidence is that the downward spiral effect of negative loops tends to be greater than the equivalent upward effect of positive loops. This is the time when we might think about the psychology of the human brain and our frequent preference for bad news over good. It is frequently stated, for example, that bad news travels many times faster than good news – take any given news bulletin and compare the ratio of 'good' news stories to 'bad'. Consumer research will tell us that people are up to ten times more likely to write a letter of complaint following a bad experience with a product or service than they are to write a letter of thanks if things went better than expected. It is not clear from any of this research what the precise ratio of good-to-bad transmission likelihood is. In all probability, the answer is likely to be either unknowable or inconsistent as we look across different situations. For the sake of specifying a convenient label only, we have used the number 7 in this article to give an impression of the average difference between good and bad transmission likelihood. Bad news is seven times more likely to spread than good news; a negative self-re-enforcing loop is seven times more likely to become a downward spiral than a positive self-re-enforcing loop is to become an upward spiral.

Thus, when we look at our function analysis models, we should take into account the existence of a significant difference in the importance of negative loops relative to the positive loops – Figure 6.

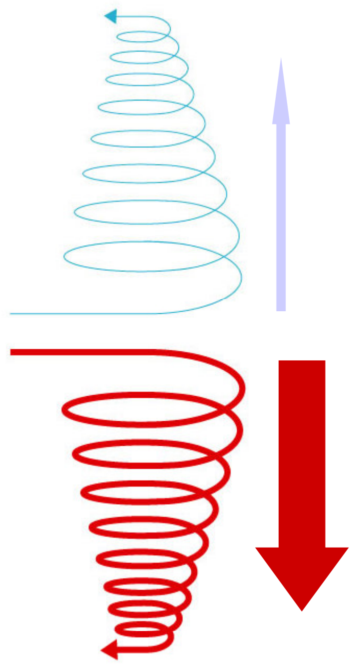


Figure 6: Downward Spirals Seven Times More Likely Than Upward Spirals For An Equivalent Magnitude of Positive and Negative Self-Re-Enforcing Loops

We often experience this kind of self-re-enforcing downward spiral when we are stuck in a traffic jam for a very long time – suddenly our brain shifts into a mode where the frustration of the wait becomes so bad that our only remaining response is to laugh. Possibly we might also begin to hope that the jam will last for an even longer time so that we will be able to tell our friends how bad it was (here we make the subconscious realization that if the jam is only moderately bad then it will not be interesting to anyone, but, if it lasts for several hours, on the other hand, then we *really* have a story to tell). A similar thing happens with the long-suffering fans of some football clubs. Watching your side go three or four goals down is bad, but when the total get to five or six goals then we start to wish for a seventh goal. And an eighth. And so on; because only when things get *really* bad do we have some news. Or do we feel that the team will become shocked out of their downward spiral and do better next time. More seriously, we may see how many regional and national conflicts appear to grow in very similar sets of circumstances.

Summary and Conclusions

The main point of this article is to reflect on the relative importance of positive and negative relationships between the different elements of a system. Although the number seven is primarily there as a banner headline, empirical evidence clearly shows that humans respond much more to the negative than they do to the positive. This phenomenon appears to be part of human nature. What it tells us is that when we observe loops of negative relationships within a system we should be very careful to make sure they don't turn into self-re-enforcing downward spirals that will eventually serve to destroy the system.

Function analysis enables us to model systems that are 'in control'. Downward spirals can also emerge through special cause disturbances or perturbations to an in-control system. Destructive downward spirals often grow in systems where the participants approach events with a win-lose mindset. The smart player reacts to any negative special cause disturbance with a win-win response. This can be a very difficult thing to do. Especially if you perceive that someone has done something bad to you. The normal reaction in these types of circumstance – as evidenced by the large bulk of governmental and industrial experience – is to fight back. When we chose to fight back with traditional you-do-something-bad-I-do-something-bad-back-again strategies we plant the seeds of a downward spiral. The key word here is 'chose'. To start or halt a downward spiral is always within the realms of our choice.

References

1) Neave, H., 'The Deming Dimension', SPC Press, Knoxville, TN, 1990.
2) Mann, D.L., Dewulf, S., 'Hands-On Systematic Innovation For Business and Management', CREAX Press, November 2003.

Humour

The hospitality we received during a recent visit to Slovenia was truly excellent; the people are great, and the University at Maribor went to great lengths to make us feel welcome. The only time we became slightly worried was when we were taken to a local restaurant for a little lunch before we returned home. The picture below is a snapshot of the top of the menu.

A big surprise to see that it had been translated into English. We hope they got the translation of this bit slightly wrong. So far, we have felt no bad after effects of the meal. Fingers crossed.

The picture was taken on one of our Nokia 7650 camera-phones. The camera part has become an invaluable part of the system (initially we thought it was a bit of a gimmick). Lately it has become a way of remembering railway timetables when trying to navigate around foreign parts with no map or knowledge of the sequence of stations on a journey.

In true Nokia fashion, however, the phone does contain a number of design ‘quirks’ that might qualify the product for one of our ‘bad-design’ awards. On the Nokia 7650, the bad-design parts come when you fill up the memory with photos, the whole system jams and there is nothing you can do about it. A more subtle one happened during one of our trips to Malaysia. Being lazy, we decided not to reset the clock to local time. Being excess baggage-conscious travelers, we still wanted to use the phone as an alarm clock. Great normally, but for some bizarre reason, if you set the alarm to go off at 00.00 (i.e. midnight, i.e. 8am local time) then even though it tells you how many hours until the alarm will go off, come 00.00, the alarm turns itself off without making even a tiny sound. Not very helpful if the workshop you are giving starts at 9. Any Nokia designers checking-in might like to check out what TRIZ has to say about robust design. Cinderella, meanwhile, might like to consider buying a different phone.

Patent of the Month

A ‘blinding flash of the obvious’ patent of the month this month goes to the Industrial Technology Research Institute in Taiwan, for making the connection between the need for accurate positioning of tiny droplets in liquid fuel injection systems and the same need in inkjet printers. Us Patent 6,640,786 was granted on November 4:

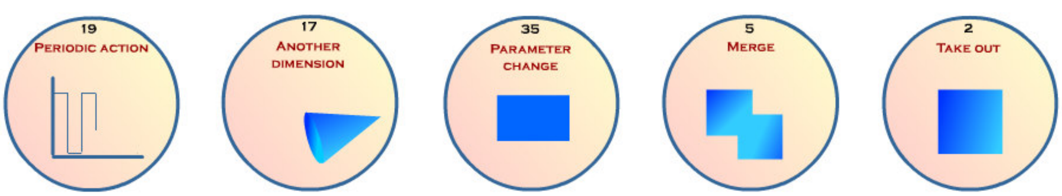
Micro-pulsation metering fuel injection system

Abstract

A micro-pulsation metering fuel injection system, comprising a throttle body and at least one injection unit. The throttle body is mounted in an inlet pipe of a cylinder of an internal combustion engine for controlling a quantity of flow of air into a combustion chamber. The injection units are mounted on the throttle body and have each a plurality of micropumps. The micropumps suck in fuel and inject tiny droplets of fuel into an air inlet inside the throttle body, so that the droplets of fuel mix with air in the throttle body, creating a mixture, which enters the combustion chamber of the cylinder. A control unit senses operating parameters of the engine and drives the injection units via a driver unit. This allows precisely to control the quantity of injected fuel and flexibly to control the distributing fuel spray, resulting in higher fuel efficiency and lore exhaust emission.

The transfer of a good idea from one industry to another is classified as a Level 3 invention within classical TRIZ. The suggestion made in the invention disclosure is that the inspiration used by the inventors was that the pressure versus complexity conflict present in conventional fuel injection systems was a limiting factor when trying to down-size from automotive to motor-cycle scale. Hence we might speculate the question ‘what else can I use to pump small quantities of small liquid droplets?’ was asked. Or maybe the connection was made the other way around; ‘what else could we do with the micro-pumps used in inkjet printers. Either way, the result is the same; a very nice ‘it’s obvious’ moment.

For those interested in a little more TRIZ substance to this patent of the month feature, if we plug the ‘pressure versus complexity’ conflict into the Matrix, we will obtain the following Inventive Principle recommendations:-



Or at least we will if we use the new Matrix (the classical Matrix gives 19, 1 and 35). Principles actually used by the inventors in their fuel injection system?

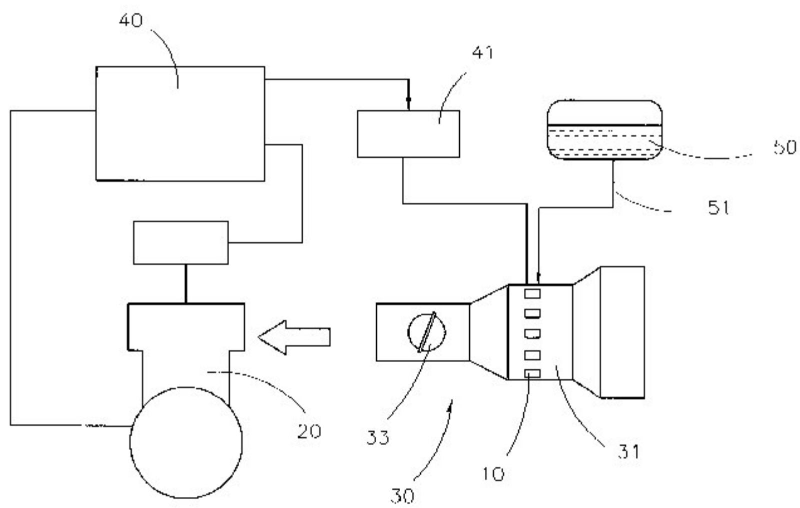
Clearly Principle 19 – given that even the title of the patent talks about pulsation.

Principle 35 – in that we have changed the pressure in the system

Ditto Principle 2 – in that we have taken out the high pressure required in conventional fuel injection systems by switching to a micro-pump. The reduction in pressure also means that the inventors have been able to ‘take-out’ the high velocity of the fuel droplets that can be a problem when it comes to keeping the droplets from hitting surfaces in the ngine and coalescing before they get a chance to be burned.

Also, the inventors have used a combination of micropumps to achieve the necessary fuel flow rates, and so we may also claim that Principle 5 has been used.

Altogether, still something of a lateral jump from fuel injection to micro-pumps, but we can at least see the abstract Contradiction tool pointing us in the same direction as the solutions already developed by the computer printer industry.



Best of the Month – MERCI 'Retreiver'

Scientists have long tried to create mechanical clot-busters: lasers to cut channels through the blockage; balloons to press open clots like cardiologists use in the heart; suction devices. So far, each has problems. They're hard to fit through tiny, twisting brain arteries, and brain clots, which have the spongy consistency of a canned peach, can't just be pushed aside like harder plaque that causes heart attacks. Concentric's retriever offers an alternative clot-removal strategy.

Specialists called interventional neuroradiologists thread a tiny tube inside a blood vessel at the groin and push it up the body and into the brain. Inside is a wire made of nitinol, a shape-remembering alloy, that promptly coils into a corkscrew shape as it's pushed out of the tube at the stroke's epicenter. Pushed through the spongy clot, the twisted wire grips tight, like a corkscrew grips a wine cork. A tiny balloon inflates to temporarily stop blood flow -- avoiding a second stroke if a piece breaks off the clot before it's removed. Doctors then gently tug backward on the wire until the clog dislodges and is sucked inside the tube.

The Retriever gets our 'best of the month' award thanks to the use of the shape memory alloy to solve a physical contradiction. It also uses Nested Doll and Another Dimension during its operation. It also saves lives. Interested readers can check out more details of the system by checking out the patent:-

United States Patent 6,530,935
March 11, 2003 Clot capture coil and method of using the same

Abstract
A clot and foreign body removal device is described which comprises a catheter with at least one lumen. Located within the catheter is a clot capture coil that is connected to an insertion mandrel. In one embodiment, the clot capture coil is made out of a solid elastic or superelastic material which has shape memory, preferably nitinol. The elasticity or superelasticity of the coil allows it to be deformed within the catheter and to then reform its original coil configuration when the coil is moved outside of the catheter lumen. In another embodiment the coil is a biphasic coil which changes shape upon heating or passing an electric current. Once the coil configuration has been established, the coil can be used to ensnare and corkscrew a clot in a vessel. A clot is extracted from the vessel by moving the clot capture coil and catheter proximally until the clot can be removed or released into a different vessel that does not perfuse a critical organ. Foreign bodies are similarly captured by deploying the coil distal to the foreign body and moving the clot capture coil proximally until the foreign body is trapped within the coil. By removing the device from the body, the foreign material is also removed.
Inventors:
Wensel; Jeffrey P. (Newport Beach, CA); **Gobin; Y. Pierre** (Los Angeles, CA)
Assignee:
Regents of the University of California, The (Oakland, CA)

Conference Review – Towards Sustainable Design Practice 8, Stockholm, Sweden, 27-28 October

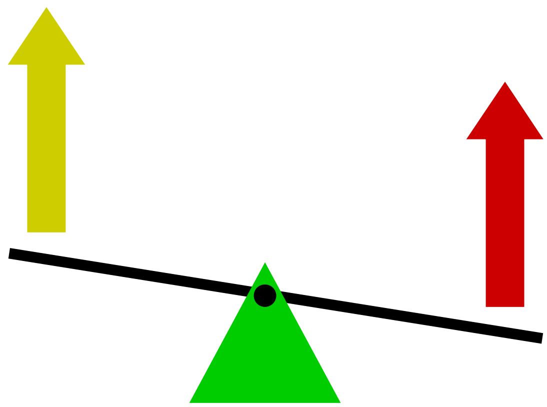
The UK-based Centre for Sustainable Design (www.cfsd.org.uk) held its eighth TSPD conference this year in Sweden. CREAX presented a paper 'systematic Sustainable Innovation' at the conference during the main presentation-centred day of the conference. Around 150 people were in attendance at the conference and during the day over 40 papers were presented in 5 parallel sessions. The overall theme of the conference was the need for innovation as the engine for delivering more sustainable product and service designs.

Perhaps because of the theme plus our main area of interest, the overall the quality of the papers appeared to be somewhat higher this year than in previous conferences – where we also presented. Readers of this newsletter are advised to check out the conference web-site (linked from the CFSD site). We particularly enjoyed the papers by:-

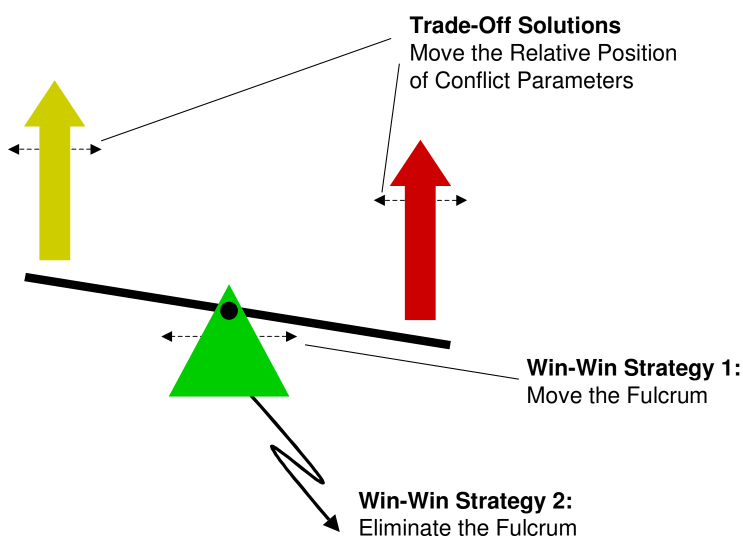
- Professor Joseph Huber from the Martin-Luther University in Germany. The paper, 'Key Environmental Innovations' was the result of a comprehensive study into 500 recent innovations purporting to feature an environmental or sustainability benefit. Of particular interest to us – perhaps because it fitted very well with the theme of our 2002 conference paper that given the choice between more benefits, less cost or less harm, the large majority of customers will rate the 'less harm' aspect significantly below the other two – was the finding that over a third of all the case studied featured a 'sustainability' improvement as a secondary factor. The main driver for this third of innovations, in other words, was something other than sustainability. Sustainability was a nice side-effect. This also fitted with our message at the last conference – which was that rather than try and convince customers to put more emphasis on sustainability issues, give them the sustainability benefit *as well* as the higher benefit and lower cost. Don't trade-off sustainability; solve a contradiction.
- Dr Peter White presented a keynote address on the development of a low-cost product (Agua-Pur) for making contaminated water drinkable. Dr White represented Procter & Gamble – a well known user of TRIZ these days. Although the word 'TRIZ' wasn't used during the presentation, the fact that the innovation resulted by taking a product idea from another part of the P&G business and asking 'what else can we do with this?' seemed to give a strong hint that TRIZ played a part in some way. The actual product, at 1cent/litre, was clearly cheap in Western terms, but it was far less clear that it would also be seen as 'cheap' when looked at through the eyes of a developing nation. Perhaps TRIZ wasn't used quite enough in the innovation – no-one it seemed asked the question, 'what else can we do with this, and who might pay lots of money for it?' The Agua-Pur product comes in the form of a small sachet that gets mixed in to water. Anyone that has done any outdoor pursuits and carried around bulky, heavy water purification equipment might immediately see a connection to the P&G product, and be extremely willing to pay several Euros a time. Perhaps P&G might do themselves some good by giving away a hundred sachets to developing nations for every premium-value sachet sold to an outdoor pursuits person? (Meanwhile, in keeping with what often happens when we see a presentation like this, we came up with an even more ideal solution – we think! – than the P&G product. If anything comes of this in the next few months, we'll let you know.)
- Dr Robert Wimmer from the Technical University of Vienna presented a fascinating paper on 'Success and Failure Factors of Product-Service Systems'. Best viewed as a good start towards a database of good and bad design practice, the paper

nevertheless presents some intriguing examples. Probably fair to say that the context would be enriched if integrated into the TRIZ/systematic innovation context.

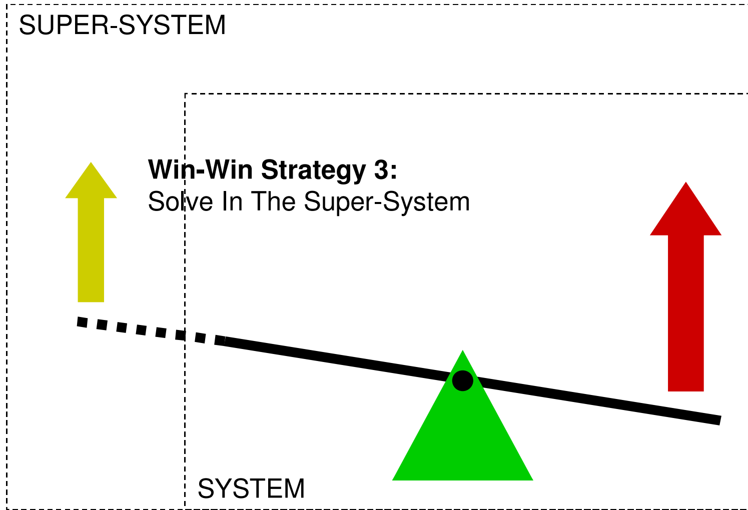
- In addition to featuring a presentation that included a picture of the Austin Allegro car – quite possibly the worst production car ever produced, and a significant factor in the ultimate demise of the UK motor industry – 'The Splendid Eco-Car' project by David Kenning presented a very neat image of the need to resolve contradictions in the eco-design context. In many ways the idea is like the see-saw concept described by Ellen Domb – so that things in conflict with one another are represented by things at either end of the see-saw:



Typical trade-off-based design is about shifting the relative positions of the conflicting forces. TRIZ strategies, on the other hand, are about shifting the fulcrum, or possibly removing the fulcrum altogether:-



The idea suggested by David Kenning is that another way of avoiding the traditional trade-off based way of doing things is to move to the super-system. A version of the image he used in his presentation is illustrated below. In several senses, the idea is identical to the physical contradiction resolution strategy concerned with shifting to an alternative system – in this case, looking for a solution by integrating elements from the super-system. The see-saw image works nicely here since when we move progressively further and further away from a pivot point, the force we actually require to counteract the unwanted forces becomes smaller. The need to move to ever more holistic problem solving perspectives is a key theme of the CREAX paper presented at the conference in 2001.



- Anyone looking for a very nice video presentation highlighting the importance of sustainable design practices is well recommended to visit the CFSD website and look for the Stuart Silver video download. The download is free.
- A final thought we arrived at via a comment from one of the session chairmen was that people put the 'harm' part of the ideality equation at the bottom of their priority list because they never asked for the harm part; it simply arrived as a consequence of the benefit they received and the monetary price they paid for it. No customer asks for pollution or child-labour, so why would they want to pay to **not** have them?

All in all, a very enjoyable experience. We definitely recommend that readers think about attending next years conference (to be held in the UK in October 2004 – call for papers out now; abstracts due 31 January 2004).

TRIZ and Biology – The Yew Tree

The English Yew tree (*taxus baccata*) has poisonous leaves. The leaves contain a hormone which keeps harmful insects that feed on it permanently immature. Since the insects cannot breed, they die out and thus help ensure the success of the yew.

This represents a more successful survival strategy than simply poisoning the insects since the insect is not aware of a problem during its lifespan and is thus unable to 'learn' to not eat the tree. It offers us an excellent application of the Preliminary Action Inventive Principle (10A, 'introduce a useful action into an object or system (either fully or partially) before it is needed').