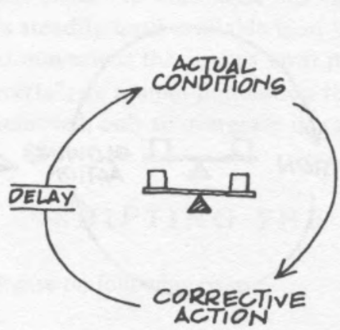
# APPENDIX 2: SYSTEMS ARCHETYPES[1]

## BALANCING PROCESS WITH DELAY

**Structure:**




**Description:** A person, a group, or an organization, acting toward a goal, adjusts their behavior in response to delayed feedback. If they are not conscious of the delay, they end up taking more corrective action than needed, or (sometimes) just giving up because they cannot see that any progress is being made.

**Early Warning Symptom:** "We thought we were in balance, but then we overshot the mark." (Later, you may overshoot in the other direction again.)

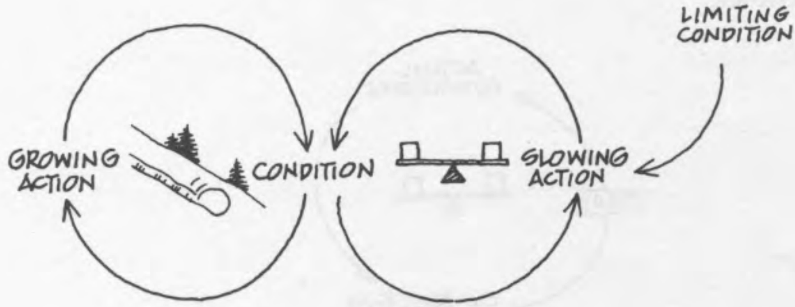
**Management Principle:** In a sluggish system, aggressiveness produces instability. Either be patient or make the system more responsive.

**Business Story:** Real estate developers keep building new properties until the market has gone soft—but, by then, there are already enough additional properties still under construction to guarantee a glut.

**Other Examples:** A shower where the hot water responds sluggishly to changes in the faucet positions; production/distribution glut and shortage cycles (such as that of the beer game); cycles in production rates and in-process inventory due to long manufacturing cycle times; the Tiananmen Square massacre, in which the government delayed its reaction to protest, and then cracked down unexpectedly hard; sudden, excessive stock market soars and crashes.

## LIMITS TO GROWTH

**Structure:**




**Description:** A process feeds on itself to produce a period of accelerating growth or expansion. Then the growth begins to slow (often inexplicably to the participants in the system) and eventually comes to a halt, and may even reverse itself and begin an accelerating collapse.

The growth phase is caused by a reinforcing feedback process (or by several reinforcing feedback processes). The slowing arises due to a balancing process brought into play as a "limit" is approached. The limit can be a resource constraint, or an external or internal response to growth. The accelerating collapse (when it occurs) arises from the reinforcing process operating in reverse, to generate more and more contraction.

**Early Warning Symptom:** "Why should we worry about problems we don't have? We're growing tremendously." (A little later, "Sure there are some problems, but all we have to do is go back to what was working before." Still later, "The harder we run, the more we seem to stay in the same place.")

**Management Principle:** Don't push on the reinforcing (growth) process, remove (or weaken) the source of limitation.

**Business Story:** A company instituted an affirmative action program, which grew in support and activity as well-qualified minority employees were successfully introduced into work teams throughout the company. But eventually resistance emerged; the new staffers were perceived as not having "earned" their positions over other qualified aspirants. The harder individual teams were pressured to accept the new members, the more they resisted.

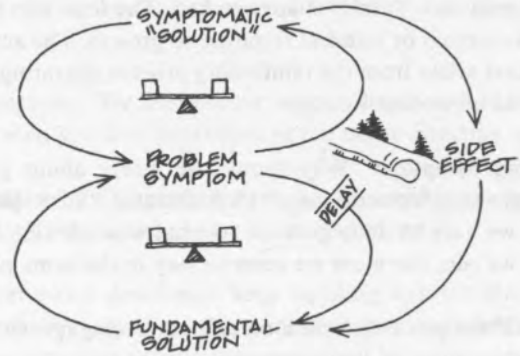
**Other Examples:** Learning a new skill, such as tennis, you make rapid progress early on as your competence and confidence builds, but then you begin to encounter limits to your natural abilities that can be overcome only by learning new techniques that may come "less naturally" at first.

A new startup that grows rapidly until it reaches a size that requires more professional management skills and formal organization; a new product team that works beautifully until its success causes it to bring in too many new members who neither share the work style nor values of the founding members; a city that grows steadily until available land is filled, leading to rising housing prices; a social movement that grows until it encounters increasing resistance from "nonconverts"; an animal population that grows rapidly when its natural predators are removed, only to overgraze its range and decline due to starvation.

## SHIFTING THE BURDEN

**Structure:** See figure on following page.

**Description:** A short-term "solution" is used to correct a problem, with seemingly positive immediate results. As this correction is used more and more, more fundamental long-term corrective measures are used less and less. Over time, the capabilities for the fundamental solution may atrophy or become disabled, leading to even greater reliance on the symptomatic solution.




**Early Warning Symptom:** "Look here, this solution has worked so far! What do you mean, there's trouble down that road?"

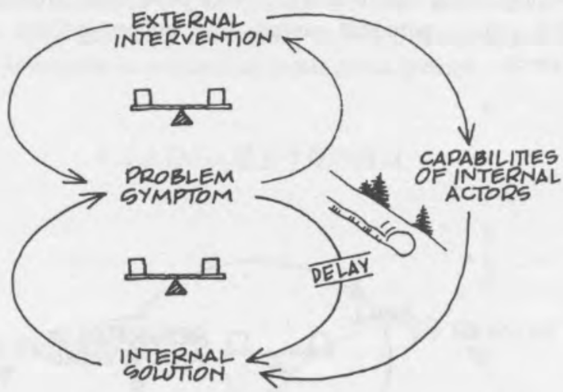
**Management Principle:** Focus on the fundamental solution. If symptomatic solution is imperative (because of delays in fundamental solution), use it to gain time while working on the fundamental solution.

**Business Story:** A dramatic new circuit board technology can be used to develop unique functionality and cost savings in a great many new product applications, but it can also be substituted for existing boards in current products. Salespeople can try to sell to "specialty customers" who appreciate the special properties of the technology and will eventually design new products which exploit it fully (the "fundamental solution") or sell to "commodity customers" who do not care about its special properties and will simply substitute it for other boards (the "symptomatic solution"). Given management pressures to meet quarterly sales targets, salespeople sell to whoever is ready to buy, which usually will be commodity customers since there are more of them and delays in the selling cycle are shorter. Over time, the dramatic new technology fails to develop a loyal customer base and becomes subject to the price and margin pressures that characterize commodity products.

**Other Examples:** Selling more to existing customers rather than broadening the customer base (The "ATP case" from Chapter 11); paying bills by borrowing, instead of going through the discipline of budgeting; using alcohol, drugs, or even something as benign as exercise to relieve work stress and thereby not facing the need to control the workload itself; and any addiction, anywhere, to anything.

## SPECIAL CASE: SHIFTING THE BURDEN TO THE INTERVENOR

**Structure:**




One area where shifting the burden structures are so common and so pernicious that it warrants special notice is when outside "intervenors" try to help solve problems. The intervention attempts to ameliorate obvious problem symptoms, and does so so successfully that the people within the system never learn how to deal with the problems themselves.

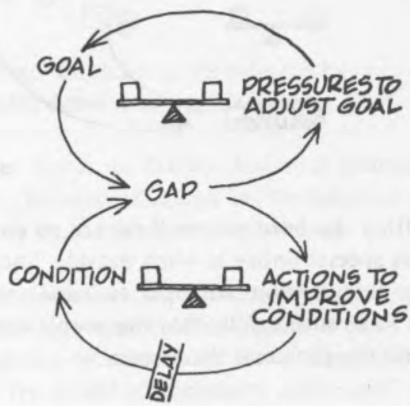
**Management Principle:** "Teach people to fish, rather than giving them fish." Focus on enhancing the capabilities of the "host system" to solve its own problems. If outside help is needed, "helpers" should be strictly limited to a one-time intervention (and everyone knows this in advance) or be able to help people develop their own skills, resources, and infrastructure to be more capable in the future.

**Business Story:** An innovative insurance company was committed to the concept of independent local offices that would call on headquarters staff only for occasional help. Initially the concept worked well, until the industry went through a crisis. Facing sudden severe losses, the local offices called in the more experienced central management for help in rewriting rate structures—a process which took months. Meanwhile, the local managers focused their attention on managing the crisis. The crisis was resolved, but the next time rate structures were called into question, the local offices had lost some of their confidence. They called in the central managers as "insurance." After several years of this behavior, the local offices found themselves without underwriters who could manage rate structure changes independently.

**Other Examples:** Dependence on outside contractors instead of training your own people. Numerous forms of government aid that attempt to solve pressing problems only to foster dependency and need for increasing aid: welfare systems that foster single-family households; housing or job training programs that attract the needy to cities with the best programs; food aid to developing countries which lowers deaths and increases population growth; social security systems that reduce personal savings and encourage the breakup of the extended family.

## ERODING GOALS

**Structure:**




**Description:** A shifting the burden type of structure in which the short-term solution involves letting a long-term, fundamental goal decline.

**Early Warning Symptom:** "It's okay if our performance standards slide a little, just until the crisis is over."

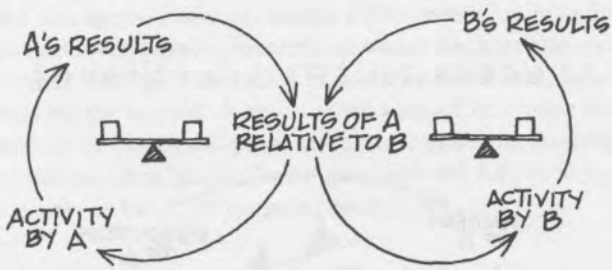
**Management Principle:** Hold the vision.

**Business Story:** A high-tech manufacturer finds itself losing market share, despite a terrific product and ongoing improvements. But the firm, oriented toward its design "geniuses," had never gotten production scheduling under control. An outside investigator discovered that customers were increasingly dissatisfied with late schedules, and were turning to competitors instead. The company stood on its record: "We've maintained a consistent 90 percent success in meeting the delivery time quoted to the customer." It therefore looked elsewhere for the problem. However, every time the company begin to slip its schedules, it responded by making the quoted delivery time a little longer. Thus, the quoted delivery time to customers was getting lengthier, and lengthier, and lengthier . . .

**Other Examples:** Successful people who lower their own expectations for themselves and gradually become less successful. Firms that tacitly lower their quality standards by cutting budgets rather than investing in developing new higher quality (and perhaps lower cost) ways of doing things, all the while proclaiming their continued commitment to quality. Lowered government targets for "full employment" or balancing the federal deficit. Sliding targets for controlling dangerous pollutants or protecting endangered species.

## ESCALATION

**Structure:**[2]




**Description:** Two people or organizations each see their welfare as depending on a relative advantage over the other. Whenever one side gets ahead, the other is more threatened, leading it to act more aggressively to reestablish its advantage, which threatens the first, increasing its aggressiveness, and so on. Often each side sees its own aggressive behavior as a defensive response to the other's aggression; but each side acting "in defense" results in a buildup that goes far beyond either side's desires.

**Early Warning Symptom:** "If our opponent would only slow down, then we could stop fighting this battle and get some other things done."

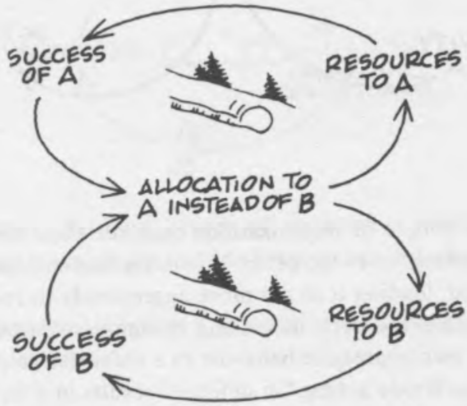
**Management Principle:** Look for a way for both sides to "win," or to achieve their objectives. In many instances, one side can unilaterally reverse the vicious spiral by taking overtly aggressive "peaceful" actions that cause the other to feel less threatened.

**Business Story:** A company developed an ingenious design for a stroller, which carried three toddlers at once, yet was light and convenient for travel. It was an immediate hit with families with several young children. Almost simultaneously, a competitor emerged with a similar product. After several years, jealous of the other company's share of the market, the first company lowered its price by 20 percent. The second company felt a decline in sales, and lowered its price too. Then the first company, still committed to boosting share, lowered its prices still further. The second company reluctantly did the same, even though its profits were beginning to suffer. Several years later, both companies were barely breaking even, and survival of the triple carriage was in doubt.

**Other Examples:** Advertising wars. Increasing reliance on lawyers to settle disputes. Gang warfare. The breakup of a marriage. Inflating budget estimates: as some groups inflate their estimates, others find themselves doing likewise in order to get "their piece of the pie," which leads to everyone inflating his estimates still further. Battle for the "ear" of the president of a company. And, of course, the arms race and the war on terror.

## SUCCESS TO THE SUCCESSFUL

**Structure:**




**Description:** Two activities compete for limited support or resources. The more successful one becomes, the more support it gains, thereby starving the other.

**Early Warning Symptom:** One of the two interrelated activities, groups, or individuals is beginning to do very well and the other is struggling.

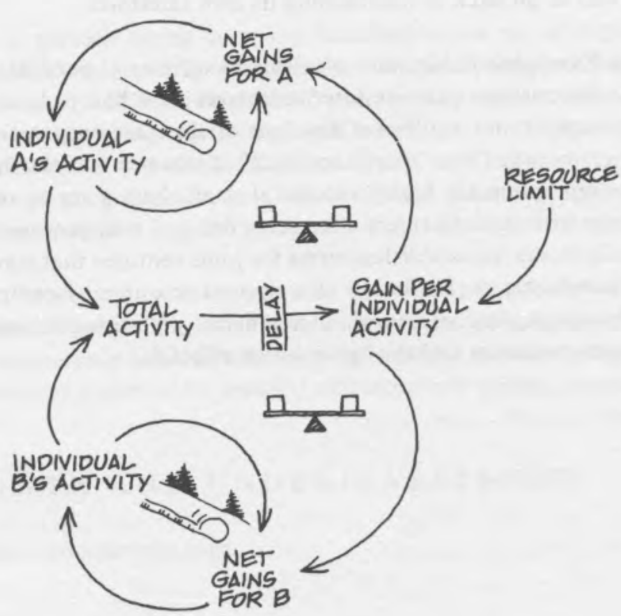
**Management Principle:** Look for the overarching goal for balanced achievement of both choices. In some cases, break or weaken the coupling between the two, so that they do not compete for the same limited resource (this is desirable in cases where the coupling is inadvertent and creates an unhealthy competition for resources).

**Business Story:** A manager has two proteges, and wishes to bring both along equally in the firm. However, one of the two ends up getting preferential treatment because the other is out sick for a week. When the second protege returns to work, the manager feels guilty, and avoids the person, thereby giving still more opportunity to the first protege. The first protege, feeling the approval, flourishes, and therefore gets more opportunity. The second protege, feeling insecure, does less effective work and receives even fewer opportunities, although the two people had equal ability in the beginning. Eventually, the second protege leaves the firm.

**Other examples:** Balancing home and work life, in which a worker gets caught working overtime so much that relationships at home deteriorate and it gets more and more "painful" to go home, which, of course, makes the worker even more likely to neglect home life in the future. Two products compete for limited financial and managerial resources within a firm; one is an immediate hit in the marketplace and receives more investment, which depletes the resources available to the other, setting in motion a reinforcing spiral fueling growth of the first and starving the second. A shy student gets off to a poor start in school (perhaps because of emotional problems or an undetected learning disability), becomes labeled a "slow learner," and gets less and less encouragement and attention than his or her more outgoing peers.

## TRAGEDY OF THE COMMONS

**Structure:**



**Description:** Individuals use a commonly available but limited resource solely on the basis of individual need. At first they are rewarded for using it; eventually, they get diminishing returns, which causes them to intensify their efforts. Eventually, the resource is either significantly depleted, eroded, or entirely used up.

**Early Warning Symptom:** "There used to be plenty for everyone. Now things are getting tough. If I'm going to get any profit out of it this year, I'll have to work harder."

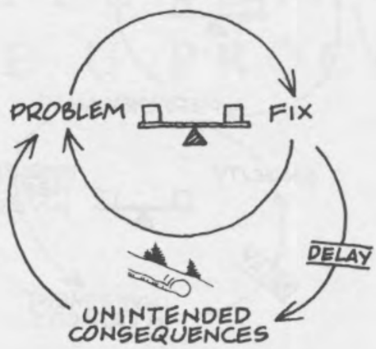
**Management Principle:** Manage the "commons," either through educating everyone and creating forms of self-regulation and peer pressure, or through an official regulating mechanism, ideally designed by participants.

**Business Story:** Several divisions of a company agreed to share a retail salesforce. Each district manager was initially concerned that the shared salesforce wouldn't give enough attention to his or her particular business, and that volume would decline. One particularly aggressive manager advised all his account managers to set higher sales targets than were truly needed, so that the salesforce would at least give them the minimum support they needed. The other divisions saw this division pushing for extra work, and decided to employ the same strategy. The new salesforce's managers wanted to accommodate all of their "clients," so they continued to accept the higher requests from the divisions. This created a tremendous overburden of work, lowered performance, and increased turnover. Pretty soon, joining the retail salesforce was only slightly more popular than joining the French Foreign Legion, and each division had to go back to maintaining its own salesforce.

**Other Examples:** Exhaustion of a shared secretarial pool. Deteriorating reputation for customer service after customers have had to listen to six different salespeople from six different divisions of the same corporation pitching competing products. (The "shared resource" in this case was the firm's positive customer reputation.) A highly successful retail chain gives up on joint sales promotions with manufacturers after being deluged with proposals by enthusiastic manufacturers, or establishes terms for joint ventures that leave little profit for the manufacturers. Depletion of a natural resource by competing companies which mine it. And, of course, all manner of pollution problems from acid rain to ozone depletion and the "greenhouse effect."

## FIXES THAT FAIL

**Structure:**




**Description:** A fix, effective in the short term, has unforeseen long-term consequences which may require even more use of the same fix.

**Early Warning Symptom:** "It always seemed to work before; why isn't it working now?"

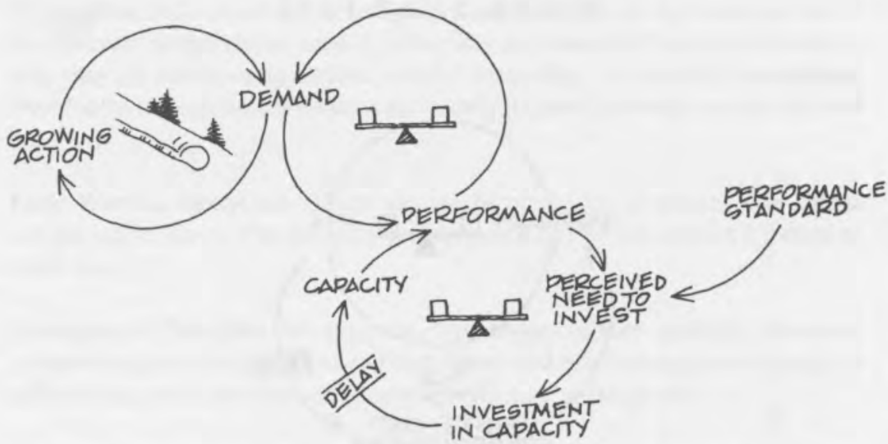
**Management Principle:** Maintain focus on the long term. Disregard short-term "fix," if feasible, or use it only to "buy time" while working on long-term remedy.

**Business Story:** A manufacturing company launched a new set of high-performance parts, which were wildly successful at first. However, the CEO was driven by maximizing his ROI, so he deferred ordering expensive, new production machines. Manufacturing quality suffered, which led to a reputation for low quality. Customer demand fell off dramatically over the ensuing year, which depressed returns and made the CEO even more unwilling to invest in new production equipment.

**Other Examples:** People and organizations who borrow to pay interest on other loans, thereby ensuring that they will have to pay even more interest later. Cutting back maintenance schedules to save costs, which eventually leads to more breakdowns and higher costs, creating still more cost-cutting pressures.

## GROWTH AND UNDERINVESTMENT

**Structure:** See figure on following page




**Description:** Growth approaches a limit which can be eliminated or pushed into the future if the firm, or individual, invests in additional "capacity." But the investment must be aggressive and sufficiently rapid to forestall reduced growth, or else it will never get made. Oftentimes, key goals or performance standards are lowered to justify underinvestment. When this happens, there is a self-fulfilling prophecy where lower goals lead to lower expectations, which are then borne out by poor performance caused by underinvestment. (This is the Wondertech structure described in Chapter 7.)

**Early Warning Symptom:** "Well, we used to be the best, and we'll be the best again, but right now we have to conserve our resources and not over-invest."

**Management Principle:** If there is a genuine potential for growth, build capacity in advance of demand, as a strategy for creating demand. Hold the vision, especially as regards assessing key performance standards and evaluating whether capacity to meet potential demand is adequate.

**Business Story:** People Express Airlines found itself unable to build service capacity to keep pace with exploding demand. Rather than putting more resources into training or growing more slowly (for example, through raising prices somewhat), the firm tried to "outgrow" its problems. The result was deteriorating service quality and increased competition, while morale deteriorated. In order to keep up with the continued stress, the company relied more and more on the "solution" of underinvesting in service capacity, until customers no longer found flying People Express attractive.

**Other Examples:** Companies which let service quality or product quality of any sort decline, simultaneously blaming competition or their sales management for not pushing hard enough to maintain sales. People with grand visions who never realistically assess the time and effort they must put in to achieve their visions.