

Robustness in Everyday Life

Primer by

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Inspired by the wisdom and
principles of Dr. Genichi
Taguchi

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Robustness in Everyday Life

What Does it Mean to be “Robust”?

The dictionary defines “robust” as:

1. *strong and healthy; hardy; vigorous.*
2. *strongly or stoutly built.*
3. *rich and full-bodied.*

However, in our context, we will adhere to Dr. Genichi Taguchi’s concepts to define robust – which can be simply stated as:



“Being on target and insensitive to variation”

To make this concept work for you in your everyday life, you must ask yourself, **“What do I consider as a goal (target), and how do I ensure that I achieve that goal regardless of the natural, uncontrollable phenomena that might inhibit my ability to achieve that goal?”**

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An Outdoor Aesthetic Example

Goal (Target): **MAINTAIN A LUSH, HEALTHY, GREEN LAWN**

Some natural variations that may prevent the goal:

- **AMOUNT OF NATURAL RAINFALL/WATER RATIONING**
- **AMOUNT OF SUNLIGHT**
- **AMBIENT TEMPERATURE/HUMIDITY**
- **INSECT ACTIVITY**

Potential actions to achieve “robustness”:

- **Use a grass seed/sod variety that will be hardy with your seasonal ranges, soil type, and potential adverse weather conditions**
- **Timer-based sprinkler system with rain-sensor feature**
- **Adjusting lawn mower cutting height for times of highest temps/lowest rainfall (e.g., July-August timeframe)**
- **Apply grub/pest control at prescribed time(s)**



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A Travel Example



Goal (Target): **MINIMUM LOST PRODUCTIVITY DUE TO EXCESSIVE DRIVE TIME**

Some natural variations that may prevent the goal:

- **TRAFFIC ACCIDENT(S)**
- **POOR WEATHER CONDITIONS (FOG, RAIN, SNOW)**
- **NON-WORKING TRAFFIC SIGNALS**
- **EXCESSIVE TRAFFIC**

Potential actions to achieve “robustness”:

- Take public transportation and be productive during the drive time
- Adjust your vehicle departure time to “miss” rush hour periods
- Adjust your vehicle’s route to include less-travelled roads, or roads with fewer traffic signals

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A Financial Example

Goal (Target): **A COMFORTABLE RETIREMENT AT A REASONABLE AGE**

Some natural variations that may prevent the goal:

- **ECONOMIC BOOMS AND BUSTS**
- **GLOBAL TURMOIL SUCH AS MILITARY COUPS AND WARS**
- **STOCK/BOND AND INTEREST RATE FLUCTUATIONS**
- **GOVERNMENTAL ACTIONS (e.g., taxation, deductions)**



Potential actions to achieve “robustness”:

- Diversify your portfolio, including precious metals, foreign equities, bonds, and money market/liquid cash
- Monitor economic conditions and make prudent adjustments (or invest with a money/fund manager that will do this for you)
- “Dollar-cost-average”, such that you are investing at highs and lows over time
- Start investing/saving early in your career, to take advantage of compounding

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A Home/Living Space Example

Goal (Target): **KEEPING A CONSISTENT, COMFORTABLE LIVING SPACE**

Some natural variations that may prevent the goal:

- **POWER OUTAGES/RATIONING**
- **GLOBAL WARMING**
- **NATURAL DISASTERS (e.g., TORNADO, FLOOD, EARTHQUAKE, HURRICANE)**
- **AVAILABILITY AND PRICE OF HEATING/COOLING UTILITIES**

Potential actions to achieve “robustness”:

- Consider self-sufficient utility sources (solar/wind power, well water/septic)
- Maintain home insurance premiums for natural disasters
- Ensure home has some battery-powered lighting, ample supply of drinkable water, etc., for emergencies
- Practice emergency procedures with family members
- Maintain an “emergency fund” to cover deductibles, uninsured items



How Can the Robust Philosophy Work For YOU?

Regardless of your age, socio-economic situation, or status:

- Identify your goals – personal, financial, professional
- Document the uncontrollable variations that might prevent you from achieving each goal.
 - List the uncontrollable variations you know about, and research the situation to ensure the list includes the most relevant items
- Document the actions you plan to take to minimize the effect and consequences of the uncontrollable variations.
 - List the actions that seem prudent, and if uncertain, consult with experts who may be able to provide better advice
- Revisit your “robustness” documentation periodically to add or delete goals and actions

Robust Design for Work Environments

The examples shown in this presentation mainly support personal and financial goals – but robustness is very effective when applied to work processes, product designs, and engineered systems, and usually involves:

- **The use of data to determine optimum system output values that minimize “loss” (maximize internal or external customer satisfaction)**
- **For product design situations, a three-stage approach of Concept Design, Parameter Design and Tolerance Design**
- **For product and process design situations, analysis tools to evaluate controllable (“design”) variables and settings that make the design insensitive to uncontrollable (“noise”) variation, and those that can be used to “tune” (target) the output**

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Robust Design for Work Environments

For more information on robustness and the application of Robust Design principles for your goals, your products or your processes, please contact:



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