A. Bringing It All Together

The exercises included in this Appendix were developed for the training course that accompanies this guide. They provide the opportunity for you to apply the concepts described throughout the guide to real world situations.

HOME IMPROVEMENT EXERCISE

Day-to-Day Asset Management – you do it all the time!

You have just purchased a house in a neighborhood that is on the rebound. Great location – a park across the street, walking distance to the grocery store, drugstore, some restaurants, etc. – and through traffic has been redirected, so the area has actually become "peaceful."

It was listed in the real estate guide as "Needs some work." The price was right, so you jumped in. Your goal is to live in the house for the next 15 years and have it gain as much value as possible while meeting your living needs.

You do a quick condition evaluation of the major elements in the house to identify areas that need improvement. Based on your assessment, you find that there is work that needs to be done in order to preserve your investment and allow you to move in.

After making the down payment, you still have about $10,000 in savings to devote to repairs. Due to your overall reduced housing expense, you expect to have about $10,000 available each year for the next few years.

Assuming all these repairs were deemed necessary, how would you prioritize the work in order to achieve the following objectives?

1. Preserve your investment in the house
2. Minimize out of pocket expenses
3. Maximize the value of the house and the repairs you make

Use the *Worksheet* and the list of *Work that Needs to Be Done* on the following pages to prioritize the work. Separate the items by year 1, year 2, year 3, etc. Include justification as to why you selected one repair over another.

After you have completed your priority list, refer to the *Home Improvement Exercise Guide* (page A-7) to assess your choices.

Home Improvement Exercise Worksheet

Make notes on why you select a particular project. Separate year 1, 2 & 3.

Project by Priority: **Price & Justification:**

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

Home Improvement Exercise
Work that Needs to Be Done

A. Improve Drainage: Runoff is currently draining from the yard towards the house and seeping into the basement, which periodically floods. General grading of the surrounding yard will direct drainage away from the house, prevent the basement from flooding, prevent foundation damage over time and make the basement usable. This project alone will not fix all the flooding problems due to runoff from the roof (see F below).
Cost of grading: $3000.

B. Landscape: This has been ignored for many years. Grade the area to remove dips, low spots and holes in the yard. Bring in topsoil and install foundation plantings, a new lawn and other landscape features that add to curb appeal and overall value of the property.
Cost of landscaping: $10,000

C. New Windows: The windows date back to the 1950s. Installing new windows will reduce heat loss and add to the overall comfort of the house. This project will result in a savings of approximately $600 per year in reduced heating costs when compared to just fixing the missing and broken windows.
Cost of window replacement: $8000

D. Fix Windows: Many of the storm windows have cracked or missing panes. Blowing rain leaks in around the sills, cold air leaks in during the winter, and hornets are getting in and taking up residence. Repairing the glass will result in a savings of approximately $150 per year.
Cost to fix window panes: $200

E. Fix Leaky Roof: Several areas of the roof leak, even during a light rain. In two small spots the leaks have damaged the walls and in one spot, leaks have damaged the floor.

a. **Overlay** the existing shingles with a new layer using the existing structural elements. This option is only available if this project is completed very soon (Selected as first or second priority) because the structural components of the roof will degrade to the point where an entire new roof will be the only option. Life expectancy is 10 years.
Cost to overlay roof: $5000

b. Do a complete **Tear-Off** of the shingles, replace bad sheeting and install new shingles. Life expectancy is 20 years.
Cost for new roof: $20,000

F. Install Gutters: Runoff from the roof is seeping into the soil around the foundation and making the basement walls wet. Even if the site grading is completed (see A above), the lack of gutters will continue to make the basement walls wet, which over time will damage the foundation.
Cost to replace gutters and downspouts: $1000

G. Replace Floor Covering: The existing floor coverings are serviceable, but in poor condition. Replacement would make the house much more pleasant to live in.
Cost to install new floor covering: $5000

H. Build a Garage: The original garage was torn down years ago. Having a place to park the car during the freezing rain and snow storms would be a welcome convenience. Additionally, there is limited storage space in the house and no workspace for do-it-yourself home improvement projects.
Cost to build a garage: $20,000

I. Replace Furnace: The existing furnace is an old, inefficient fuel oil model, but it keeps on running. The furnace repairman says that parts are still available and he can keep it working for a few more years. A new 95% + efficient natural gas furnace will save approximately $500 per year in heating costs and eliminate repair costs on the old furnace.
Cost to replace furnace: $5000

HOME IMPROVEMENT EXERCISE FOLLOW-UP GUIDE

Education Goals

- Introduce the concept of asset management and the decision making process.
- Demonstrate that everyone uses asset management principles in their everyday lives.
- Introduce the idea of having an inventory of assets, asset condition and the necessity of those two items in the asset management process.
- Introduce the principle of treatment cost effectiveness.
- Introduce the concept of "the cost of waiting" when evaluating maintenance to be deferred.

General Rules of Asset Management in a Resource Limited Environment

- When presented with a choice, always select the project with the lowest cost per unit of improvement or time of payback.
- First, select projects that will stop or prevent damage to the asset.
- Second, select projects that have the potential to save money in the future.
- Third, select projects that add functionality or value to the asset.

Prioritization Based on Basic Asset Management Principles

Some projects have the potential to save money in the long run by reducing losses, others are necessary to prevent further damage to the asset, and still others add value and functionality to the asset. The temptation is to quickly select projects that have a high "WOW" factor, such as building a new garage or finish landscaping since these greatly change the outward appearance of the house. However, it is irresponsible to add new features to the house when the basic structure is not being maintained and is rapidly deteriorating from damage.

E.a. Roof Overlay: Roof repair is the highest priority because damage to the rest of the asset will result if the repair is not made. An Overlay has a cost effectiveness of $4000/10 years = $400 per year; a Tear Off $10,000/20 year = $500 per year. Costs per year are not that far apart and total re-roof lasts longer, but the Overlay solves the current problem and frees up $6000.

D. Fix Windows: This project will keep water damage from degrading the asset and will make the house livable by stopping insects and cold drafts. It will also allow the house to be heated—even with the old furnace. At $200, this almost pays for itself the first year.

A. Improve Drainage: This will keep the basement from flooding and prevent the foundation from degrading—critical to the asset. It may also make the space usable.

F. Install Gutters: This will stop damage to the foundation – critical to preserving the asset.

Note: The above repairs just about take care of your first year budget.

I. Replace Furnace: This project reduces energy costs and has a time of payback of 10 years.

C. New Windows: This project reduces energy costs but has a payback of 40 years. Do half one year and half the next?

G. Replace Floor Coverings: This adds to livability of the house, but is not critical and has a relatively high cost.

H. Build a Garage: This adds new functionality to the asset, but comes at a high cost.

B. Landscape: This adds resale value through ascetics, but is high in cost.

Apply the Home Improvement Exercise to Your Road Network

In the world of roadway management, setting priorities is not always as cut and dry as in the home improvement example. In the example, the constituents probably all had the same interests and objectives, whereas a city, village or county road commission is challenged with a diverse group of constituents with differing interests and objectives – sometimes in direct conflict.

The basic concepts, however, remain the same. The General Rules of Asset Management are adjusted based on social, economic and political needs. For example if an agency has goals that address the need for improving capacity, expanding the road network for economic development or changing the function on parts of the network, those needs must be rectified with the general rules above. You should not, however, simply toss the General Rules out the window. That approach continues the deteriorating spiral that most agencies find themselves in today, a spiral that is expensive and painful to stop.

In the house example you used some common features of a transportation asset management system:

- An inventory of assets (you inventoried the house when you purchased it)
- An assessment of their condition (you inspected the house when you purchased it and documented conditions)
- A list of projects, project costs and cost/life benefits (the list of projects provided)
- A management goal (to live in the house for the next 15 years and have it gain as much value as possible while meeting your living needs)
- Project selection policies (preserve first, minimize cost, and maximize value)

"Bang for the Buck"

There are a variety of treatments that can be applied to a pavement to extend its life. Treatment costs range from low to high and they provide different service life under given conditions. Agencies using an asset management approach must evaluate all the treatment options at their disposal, based on cost of the treatment and the added service life it provides. The goal is to repair pavements using the treatments that provide the greatest service life to cost ratio – greatest "bang for the buck".

Capital Preventive Maintenance

There is a class of pavement management treatments called Capital Preventive Maintenance (CPM). CPM is the planned set of cost-effective treatments applied to an existing roadway that retards further deterioration and maintains or improves the functional condition of the system without significantly increasing the structural capacity. The purpose of CPM fixes is to protect the pavement structure, slow the rate of deterioration, and/or correct pavement surface distress. As you have seen in the Home Improvement Exercise, CPM is at the heart of asset management. These projects can also be viewed as projects that save money in the long run because pavements that are not treated early with CPM will require exponentially more expensive structural treatment later – the "cost of waiting."