EVALUATING
ACADEMIC READINESS
FOR APPRENTICESHIP TRAINING

Revised for

ACCESS TO APPRENTICESHIP

COMMUNICATIONS SKILLS
EVALUATION OF INFORMATION

AN ACADEMIC SKILLS MANUAL
for
The Construction Trades (Structures)

This trade group includes the following trades:
Drywall & Acoustical Applicator, General Carpenter,
Mason (Brick & Stone and Restoration), Reinforcing Rod Worker, Roofer,
Terrazzo, Tile & Marble Mechanic

Workplace Support Services Branch
Ontario Ministry of Training, Colleges and Universities

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In preparing these Academic Skills Manuals we have used passages, diagrams and questions similar to those an apprentice might find in a text, guide or trade manual.

This trade related material is not intended to instruct you in your trade. It is used only to demonstrate how understanding an academic skill will help you find and use the information you need.

COMMUNICATIONS SKILLS
EVALUATION OF INFORMATION

An academic skill required for the study of the Construction Trades (Structures)

INTRODUCTION

Evaluation of information *means careful consideration of information in order to make a judgment about its purpose, meaning, or accuracy*. We evaluate information to understand and solve a problem, to plan a job, or to choose a material, a tool or a method to do a job. As you learn your trade, and as you work, you will use this skill to make the best possible decisions about how to use information.

In order to make the best choices you need the best information. During training, and on the job, you will have many sources of information including textbooks, manuals, tables, diagrams as well as your teachers, supervisors and co-workers. You will decide if the information you have been given is accurate, or if it is just someone's opinion. And, you will decide how to use that information.

In this unit, we will examine evaluation of information under the following headings:

- Getting the right information
- Using tables, diagrams and text to select relevant information
- Cause and effect
- Fact and opinion

PART I
GETTING THE RIGHT INFORMATION

In order to work through a project in an organized and effective way, you need to assess or ***evaluate*** the steps required to successfully reach your goal. Start by thinking about and planning the whole project before you begin any work**.**

> **Example:** You have a job to complete. You need to plan how you will proceed from the beginning of the job through to the end. Identifying safety or problem areas is probably a good first step. Next, you have to organize information, tools, materials, and equipment. Once you have all of the information, make a list in your head or on paper of how to proceed with the job. Now you are ready to actually start working.

Approach your work systematically. The first step in a systematic approach is to evaluate your situation. Size up the job to identify safety or problem areas. Next, organize the information, tools, materials, and equipment. The goal is to think about and plan the project *before you begin*.

The Right Information

Once your purpose is clear, you can gather the right information from the right texts and manuals, manufacturers' guides and suppliers. Choose the table or text that is relevant to the job.

Examples:
If you work in Ontario, you need Ontario's codes.

If you work with metric tools, follow the guides for the metric system – not U.S. or Imperial systems.

Making evaluated choices

When you have found information that seems relevant, you have to evaluate whether it is exactly what you need.

Example: Workplaces are supplied with safety equipment such as fire extinguishers. The choice of safety equipment is based on evaluating your working conditions and matching the equipment to the situation. To determine the class or type of fire extinguisher needed on the work site, you need to know information such as:

- the square footage of the work area,
- the presence of heat, combustibles, flammable products, chemicals, liquids, gases, etc. and
- legal requirements such as up to date regulations and fire and safety codes for your jurisdiction (your city, county or province).

Next you need information about types or classes of fire extinguishers such as the following:

- size,
- discharge times,
- approximate range of extinguisher, and
- the types of extinguisher used for different types of fire.

Now you can evaluate the situation and make a decision as to which types of fire extinguishers are required.

The right choice is based on an evaluation of all the information gathered.

General steps used in making sound decisions include:

1. evaluate the situation,
2. get up-to-date information,
3. make sure you understand the information, and,
4. use it to make your decision

Read Passage 1 below. It is about seasoning green lumber. Several areas need to be evaluated. We will look at these at the end of the passage. **Answer the questions that follow. The answers are at the end of this skills manual.**

Passage 1
Seasoned Lumber

Wood will take on and give up moisture from the surrounding air until the moisture in the air and wood are balanced. The humidity changes in the air results in changes to the amounts of moisture in wood. The moisture content changes to stay balanced with air humidity. These changes to humidity and moisture content in wood affect the dimensions of finished wood parts such as doors, floorboards and drawers. Dimensions will shrink or expand depending on the relative humidity.

Seasoned lumber has moisture content reduced to a level specified for its grade and for its use. Two methods used to season green lumber are air-drying and kiln drying.

Air-drying requires lumber to be carefully stacked with wood strips between the layers and with space at the edges of the boards. These spaces allow air to circulate freely between layers and edges. This method can create additional defects in the wood.

Kiln drying is faster than air-drying. Green lumber is placed in huge kilns where temperature and humidity are controlled. In the first stage, steam keeps the humidity high while the temperature is kept low. Then the temperature is gradually raised while the humidity is lowered. The air is constantly circulated by fans.

Questions:

1. Seasoned lumber will be a better choice for doors, floors and drawers than unseasoned lumber.

   T F

2. In a typical Canadian home, when would a carpenter expect wood to show most shrinkage?

   a) in winter
   b) in summer
   c) approximately the same for all seasons
   d) cannot predict this

3. By referring to Passage 1, you could calculate the allowance needed for expansion and shrinkage in various types and grades of lumber.

   T F

4. Why would a builder or carpenter choose kiln dried over air dried lumber for detailed work?

   a) Kiln drying is faster than air drying.
   b) The air is constantly circulated by fans.
   c) Kiln drying does not add defects.
   d) All of the above.

Evaluation

This passage describes one factor that could cause a problem as it affects the performance of a common building material. The passage goes on to discuss two methods of dealing with the problem and tells us how each method will have a slightly different result. Information like this, about a preparation process, can help you evaluate a product to make a choice. This passage can help you choose a product that will be an acceptable quality at the lowest cost.

Example:
If the important criteria is cost, you may choose air dried lumber.

If the important criteria is defect free lumber, you may choose kiln dried lumber.

Be aware that other factors can play a part. There are things about this lumber that we still do not know:

- What do the defects look like?
- Do they affect performance or strength?
- What applications are seriously affected by these defects?

You need answers to such questions and so you look for the standards, the manufacturers' guides and codes which tell what is restricted or prohibited, what is allowed and where.

Experience helps
Both knowledge and practice are required in making evaluations like this one. While a text or manual can explain information or techniques (knowledge), it cannot give you the skill.

- You will have to acquire this by trying the techniques and then practicing them *in a variety of situations.*
- As you practice the skill or technique, you will evaluate the results, try again and re-evaluate until you are satisfied that the technique has been mastered.

Generally, if you are aware of what kinds of problem often occur, you can watch out for them and be prepared to react to correct the problems right when they start to happen. You are evaluating the information or feedback you get from your work as to how well it is going

Learning one step at a time
Passage 1 is an example of evaluation that reminds us that it is important to assess or evaluate our skill, experience and knowledge in any area. The quality of the product choice, depends on the trades person's skill, experience and knowledge about how a material behaves or how a tool is used.

Example: If you are at the beginning of your career, you will need to look for the information you need about kiln dried and air dried lumber. With experience, you will automatically know which is the best choice.

Evaluation of your understanding as you learn and then practice new skills is important. You assess how well you know the theory of a skill and then assess your practice of the skill to ensure that you understand and can carry out a task using the skill.

This is gradual learning process, of – study – evaluate – , practice – evaluate, takes time but the results will be worthwhile. It is the step by step learning that all skilled trades people go through.

In Brief
You evaluate any task as you make decisions about how to handle it. The evaluation includes, but is not limited to, the following:

- the purpose of the task,
- the understanding of each factor affecting the task,
- manufacturers' recommendations,
- where to find complete information, and
- your own skill and knowledge.

You need answers to such questions and so you look for the standards, the manufacturers' guides and codes which tell what is restricted or prohibited, what is allowed and where.

Following up
When information leaves you with one or two unanswered questions, you need to search for answers.

> **Example:** You read this:
> The experience of the welder often has a bearing on the size of the electrode. In particular, for out-of-position welding, the welder's skill determines the size of the molten pool that he/she can control.
>
> Now you need to know how to control the size of the molten pool. Your job is to find the right sources to explain this.

When you look for answers to questions, you accomplish two things:

1) You do the job you've been hired to do with the right tools, equipment and metals.
2) You develop your research skills which increases your knowledge of the trade.

You may get information that tells you that you need to evaluate your experience and /or be prepared to try, or to try again.

> **Example:**
> It is easy to operate the disc sander but difficult to produce an even surface – that is, unless the operator is experienced. Experiment to determine how to maintain an even pressure and smoothness of motion so you achieve the required surface.

You may need to evaluate how information applies to you, you have to evaluate what you know.

> **Example:**
> In many cases, the timing can be left to the discretion of the operator.
>
> Consider: When can I use my judgment instead of a guideline?

Observing What's Important
Evaluating information means being observant. Trade materials use a variety of methods to emphasize important information. You may see words such as **NOTE:** or **Caution**. You may see

boxed information, different sizes or types of print, or symbols such as ▸, !, or ▪. These are signals used to catch your attention so you read the information that comes next carefully.

Use the signals to make sure you observe all essential points or steps. Look over the material first to note the highlighted information. Signals give advance warning about an important safety issue or an essential procedure. Reread these points and make sure you follow any instructions.

- **Use utility knives with *retractable blades only*. Utility knives cause more cuts than any other sharp-edged cutting tool.**

WARNING: Do NOT interchange thread types. Damage will result to the bolt or to the threads of the part.

Many accidents occur to workers while getting on or off ladders. Loss of footing causes up to 40% of these accidents.

The **bold print**, CAPITAL LETTERS, coloured type, and box make information stand out. Pay attention! The information is designed to keep you safe and your materials in good shape.

PART II
SELECTING RELEVANT INFORMATION

As become familiar with technical information, your ability to identify and select the right information improves:

- You distinguish between general rules that apply to most situations and unique situations where you have to figure out the best way to proceed.
- You notice that patterns and principles you use today also can apply to future tasks.
- You see the *relevance* of information you come across.

Charts and Tables
Charts and tables give you quick information. They are designed to be orderly, simplified, and usually in a list format. You can see all the information and select what fits your situation.

Tables can guide you in selecting a curing time for concrete, or a construction material. Tables rate tools to help you decide which to use for a job, or which ones you might want to buy. Tables also compare the advantages and disadvantages of a procedure or product.

NOTE: *Information in a table should be reliable, but it may not cover all the information you need. If it doesn't, make sure to use a number of sources to get a complete picture. Be sure you use current tables and up-to-date information suitable for the task.*

Table 1 below illustrates the clear and simple organization of tables. The row headings clearly tell you what the numbers mean. The table allows you to find what you want quickly.

Read Table 1. Glance over everything before reading so you know what is being compared.

Table 1 SOFTWOOD LUMBER SPECIES AND GROUPS IN CANADA

Commercial Species Group Designation	Grade Stamp Identification	Species in Combination	Wood Characteristics
Douglas fir -Larch (North)[1]	D Fir-L (N)	Douglas fir Western larch	Woods similar in strength, weight; high degree of hardness; good resistance to decay; good nail holding, gluing, painting qualities. Colour ranges: reddish-brown to yellowish-white.
Hem-Fir (North)[1]	Hem-Fir (N)	Pacific Coast hemlock Amabilis fir Grand fir	Light woods of moderate strength; works easily, takes paint well, holds nails well; good gluing characteristics. Colour ranges: pale yellow-brown to white.
Eastern hemlock Tamarack (North)[1]	Hem-Tam (N)	Eastern hemlock Tamarack	Moderately strong woods, mostly for general construction; fairly hard and durable. Colour ranges: yellowish-brown to whitish.
Coast species[4]	Coast Species	Douglas fir Western larch Pacific Coast hemlock Amabilis Grand fir Coast Sitka	See characteristics under groups where listed above. Light, resilient wood of moderate strength; works and takes paint easily; holds nails well. Colour ranges: creamy white to light pink, with large proportion of clear wood.
Black cottonwood[2] and [3]	B Cot	Black cottonwood	Characteristics similar to those of northern aspen group, but lower in strength and stiffness.

Note:
(1)Designation “North” or “N” in the grade mark provides regional identification for lumber exported to US.
(2)Northern aspen and black cottonwood are technically hardwoods, but are graded and marketed under softwood standards.
(3)Normally, not marketed in Canada.
(4)Allowable stresses for Northern species and Coast species are based on weakest species in combination for each property.

This table provides information about softwood lumber in Canada such as:

- how species are grouped for commercial purposes,
- how each group is identified by its grade stamp,
- names of various species belonging to a category, and
- characteristics of each species: their strength, weight, colour, and so on.

Did you also read the **Note:** at the bottom of the chart? If not, read it now. To evaluate *how, when* or *whether* to use any information, it is important to *read everything available to you.* The note at the bottom provides more details about welding forces.

Be sure to read all notes and decide how or if they apply to your job. The note with Table One tells you this:

- you the meaning of "North" or "N",
- that aspen and cottonwood are hardwoods but marketed as softwood, and
- uses for some of the species need to be examined.

Notes with tables

Notes, or footnotes, that are with tables include essential information. You will have to read and follow the directions found in a table, at the bottom of the table and in the guides. Much more information is available to you when you combine footnotes with the table details. When you have more information to work from, you can decide how or if they apply to your assignment. You can *evaluate*. There is always a good reason for footnotes, so make sure you get all the details.

Notes explain terms or abbreviations.

Example:
Note: PSIG stands for pounds per square inch gauge.

Notes point out exceptions to a use.

Example:
Regional differences may require different usage.

Notes guide you to make correct adjustments.

Example:
Nominal" is size designation for the trade. It is not always the actual size. For example, *actual* thickness of hardwood flooring is 1/32 inch less than nominal size. "Actual" size refers to *mill* size.

Aluminum nails are recommended for maximum protection against staining.

Notes guide you to the information you need.

Examples:
Consult local suppliers and local codes available at Planning and Building Department.

Notes may tell you where to find more details.

Examples:
See Figure 3-1 for a cross section of this diagram.

See Guide to Species Lumber in Canada for characteristics and availability.

How And When To Use Information

To decide *how and when* to use information, it is important to evaluate whether it is relevant to a specific situation. The information must:

- be reliable,
- be complete, and
- answer all the questions about the situation.

You may need to read from more than one source to get the information you need. When you have enough information to work from, you can decide how it applies to your task.

Diagrams and Text

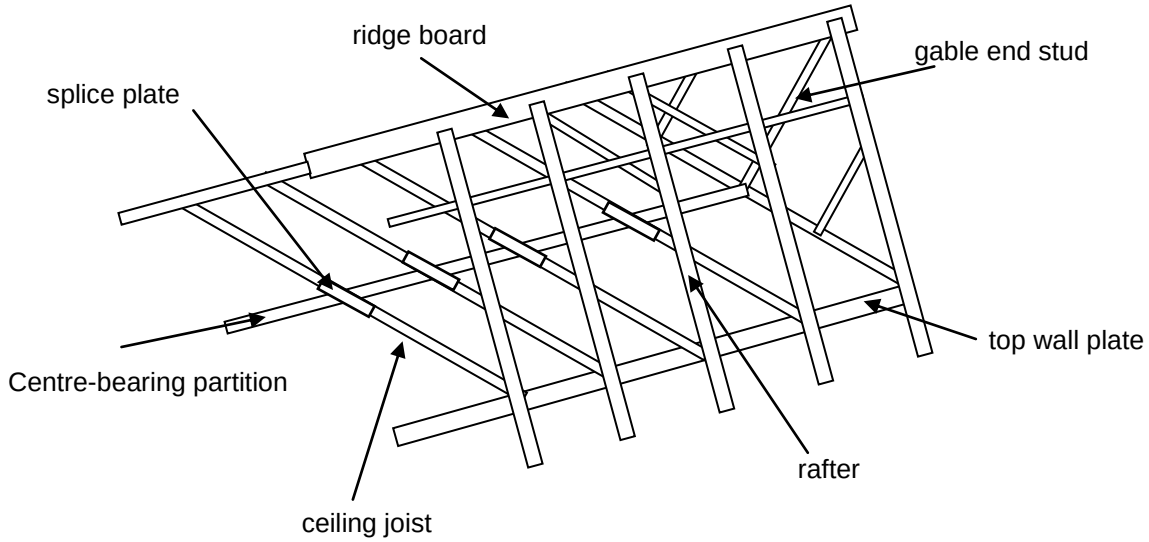
Passage 2 below describes one type of pitched roof. As you read, think about the areas that call for planning decisions or additional information. In short, *evaluate what you read.*

Read Passage 2 and answer the questions that follow. Answers are at the end of this unit.

Passage 2
Pitched Roofs

The simplest form of pitched roof is the **gable**. Rafters are all cut to the same length and pattern and erection is straightforward, (See Figure 1 for framing details). Gable roofs may include either gable or shed dormers which allow additional light and ventilation in the second floor rooms. The shed dormer provides more options for headroom, floor space and light.

FIGURE 1: Ceiling and Roof Framing with Ridge Board
Ceiling joists butted with splice plate over centre bearing partition.



Ceiling joists support the ceiling finish and act as ties between exterior walls and, in some cases, opposing rafters. They may also support roof loads transferred to them by dwarf walls which are used as intermediate supports for rafters. If this is the case, they need to be increased in size by the appropriate amount. Refer to local building codes and Table A for information on ceiling joist spans. When the joists support floor loads, determine the size by using Floor Joist Tables B and C (omitted).

In normal pitched-roof framing, the ceiling joists are nailed in place *after* the interior and exterior wall framing is complete, but *before* the rafters are erected. This is done to prevent the thrust of the rafters pushing out the exterior.

Questions:

1. When ceiling joists support roof loads, the span will be approximately the same as when they do **not** support roof loads.

   T **F**

2. By referring to Figure 1, you can identify the splice plates.

   T **F**

3. Which topic does Passage 2 give the least information about?

   a) why a gable roof is a simple form of pitched roof
   b) in which situations ceiling joists will support opposing rafters
   c) how to determine joint size to support roof load
   d) where to find information when joists support floor loads

4. Passage 2 gives the sequence and nailing practice for *normal pitched-roof framing.*

   T **F**

Evaluation

Passage 2 describes an aspect of framing – pitched roof and ceiling joists. It tells you to look at the figure for details. It indicates where you might adjust the design. It directs you to local building codes and Tables for specific guides to make these adjustments. It states the sequence for nailing ceiling joists for a normal pitched-roof.

The passage also indicates areas of adjustments, exceptions or differences to the routine job. This means a direction may not apply to your situation. The phrases below draw your attention to exceptions or adjustments:

- In some cases …
- They may also …
- If this is the case …
- When the joists support …
- In normal pitched-roof framing ...

In a passage like this, someone has evaluated a task and points out areas which you will have to evaluate as you do a job. Using the diagram and text together helps when evaluating sequence, placement, load, span and other aspects of a roof framing project. This kind of evaluation will direct you to make adjustments in the framing or to slightly alter procedures. It may help you to do a job efficiently or to avoid a problem you might otherwise encounter.

There's a bit missing
It is just as important in any evaluation to recognize when a piece of information is missing.

In some instances, you read information that causes you some difficulty or uncertainty.

> **Example:** You might read this about tension:
> Materials can withstand a certain amount of stress before they break or weaken.
> What exactly does *a certain amount* mean? The information doesn't explain this, so how do you know?

> **Example:** In a table on characteristics, uses and properties of copper, you find this:
>
> It has relatively high strength but is difficult to cold work.
>
> The note doesn't explain what *relatively high strength* means, or what metals copper is compared to. Is it difficult for an apprentice *to cold work* or for everyone?

Something is missing: you may know what these directions or notes mean, but if you don't, how can you evaluate the strength of a metal, or the difficulty you would have working with it, or your own safety?

Up-to-date information should be reliable. But, if information is not clear to you or details are missing, you cannot evaluate thoroughly. New developments and materials in your trade mean that products and techniques, standards and codes change. Make sure you keep up to the standards. Make sure you know who to ask for explanations or clarification to get the whole picture.

PART III
CAUSE AND EFFECT

*When we refer to **cause and effect,** we are evaluating a relationship between two events*. We want to see if one event is responsible for causing another event to happen. The connection between the two happenings can be established:

- by careful evaluation based on repeated observation,
- by referring to recognized standards and manuals, and
- by talking to respected supervisors and workers in the trade.

Safety on the job often means being aware of cause and effect. If a careless step can cause you harm, you should know the effects of that action. Safety warnings often highlight the cause and effect relationship in some way, especially if the effects are serious.

A warning might tell you to avoid doing something that can *cause* a danger. The warning may also state the consequences *effects* and general safety directions.

> **Examples:**
> Avoid stringing wires for temporary circuits.

Frequent relocation of circuits can loosen connections. This can break insulation, creating fire and other hazards.

Remember that electricity is ***always*** a potential source of danger. Consider all electrical wires and equipment to be live until they are tested.

Recognizing cause and effect relationships can help you understand:

- what action causes a problem,
- what action solves a problem without creating a new one, and,
- what action can prevent a problem from happening in the first place.

A problem happens because something causes it. When you are searching for the cause of a problem, look at the relationship between actions are closely related to the problem. As you search for solutions, think about how to change the factors that have caused the problem. When planning a project, think ahead to the logical order of procedures so that you can avoid any action that has the potential to cause a problem.

Who (or what) caused it?
In this sentence it's clear what happened: *Fred threw a snowball and it went through the shed window.*

Fred threw a snowball, resulting in a broken window. You can change the order and still make sense of the relationship: *The window was broken because Fred threw a snowball through it.*

Cause and effect relationships are often clear. The next example describes a cause, the weight of concrete on the soft wood, and the effect, the breaking of studs and joists:

In this example:

- The first sentence gives you a cause – a drill bit that spins *too fast* or has too much pressure applied.
- The second sentence tells you the effect of the action – overheating and softening of the bit.

We can reverse the order of the sentences and still make sense of what happened:

A drill bit can soften and be ruined if it overheats from spinning too fast or being pressed too hard.

But we ***cannot*** reverse the order of the relationship and still make sense. In other words, the result is not the cause. We cannot say:

*A drill bit which softens and is ruined from overheating **will cause** the bit to spin too fast and with too hard a pressure*.

And, we cannot say: "*A broken window caused a snowball to be thrown."*

It doesn't make sense if you mix up the cause and result. The events occur because of a cause and effect relationship. You have to keep this relationship in mind as you troubleshoot. As you search for problems and their solutions, remember to note the order of the actions even if the *sentence order* is changed.

Take two directions to study cause and effect

In practice, we often work in two directions – backwards and forwards – when we talk about cause and effect. Sometimes we know what happened (the *effect* or *result*), but we don't know why (the *cause*). Sometimes we know what action we are taking (the *cause*), but we don't know the effects or results of it.

> **Example:** As you are driving on a winter's night along an unfamiliar concession road, think ahead. Predict the likely results of your actions. You may do any of the following:
>
> a) skid into a ditch,
> b) miss a turn and get lost,
> c) hit an icy patch and spin, or,
> d) be lucky and arrive safely.

You have worked from your present actions forward to predict the probable or possible effects. The purpose in doing this is to evaluate the likelihood of an event taking place - of *a, b, c, or d.* When you evaluate the effects of what you are doing now, you can change your behaviour to avoid or prevent a problem.

> **Example:** When you know that improper care of a tool reduces its life and efficiency, you can do something to avoid this result. You can evaluate your own practices to see how they compare to recommended practices. The result will probably be that you:
> - use tools only as directed,
> - observe how experts handle and store their tools,
> - properly lubricate, and,
> - repair if necessary.

Passage 3 outlines a relationship between cause and effect. The purpose is to understand and, therefore, avoid poor or ruined work. **Read Passage2 and study Table 2. Answer the questions that follow. Answers are at the end of this skills manual.**

Passage 3
Pneumatic Tool Maintenance

Tools and equipment cannot operate correctly unless you take proper care of them. Although air tools do not require much upkeep, basic maintenance will prevent problems. For example, storing a tool with water in it will cause moisture to gather in the lines and to be blown into the tool when next used. Also, rust will form resulting in a shortened life for this tool.

Maintain tools and equipment. *More jobs are ruined because of poor care than by any other single cause!* If a tool is not functioning properly, fix it.
These are the most common causes of pneumatic or air tool malfunction:

- poor or lack of proper lubrication,
- excessive air pressure or lack of it,
- excessive moisture or dirt in air lines.

See Table 2 for a troubleshooting guide to air tools.

Follow the recommended air pressure for all air tools. An overworked tool will wear out faster. It may cause a series of problems as well: if a tool with worn parts is used, it will use more air pressure; the air compressor may become overworked and put out air that is not clean or dry which may shoot back into the tool. And so on....

Table 2 Troubleshooting Guide For Air Drills

Problem	Probable Cause	Recommended Action
Tool does not run, air flows freely from exhaust, spindle turns freely.	Rotor vanes stuck with dirt or varnish.	1. Check for dirt in inlet. 2. Pour liberal amount of air tool oil in air inlet. 3. Operate trigger in short bursts. 4. Disconnect air supply; then turn empty and closed drill chuck by hand. Reconnect air supply. 5. If still not operating, have tool checked by authorized service centre.

Questions:

1. According to this passage, a technician or mechanic could avoid most of the causes of ruined tools and equipment.

   T F

2. Which is the most likely cause of shortened pneumatic or air tool life?

   a) the formation of rust
   b) storing the tool with water in it
   c) reduced or excessive air pressure
   d) all of the above

3. If you cannot fix an air drill yourself, you should replace it immediately.

   T F

4. Which is **not** a common source of a ruined pneumatic tool?

   a) frequent use
   b) lack of air pressure
   c) dirt or varnish in the rotor vanes
   d) worn out parts

Troubleshooting Guides

Troubleshooting guides list common causes of problems and solutions so you can find and solve them quickly. Table 2 is an example of a cause and effect guide found in your trade.

Look for the places the problem could have occurred. As you eliminate possible causes, narrow in on the most likely ones. This process will help you find the cause of tool malfunction in a logical manner. The cause will lead you to the solution such as a changed method, a different technique, or a tool replacement.

Test your abilities
Evaluate the situation and yourself.

If the troubleshooting process leads you to the limits of your own expertise, you may have to find another source of information. Tables and manuals can help you make this assessment.

> **Example:** Under the heading, *Recommended Action* in **Table 2,** step # 5, you read this: *have tool checked by an authorized service centre*. Now, you know to go to a service centre for more help.

Directions in manuals may say something like:

- *if the tool is not functioning properly...*
- *Maintain tools...*
- *use proper lubrication*

These directions assume that you know what *functioning properly, maintaining tools,* and *proper lubrication* mean, and that if you don't know, you will find out. An important part of evaluating a situation is to figure out when you have to look something up, or when you have to find further information. It also means knowing where to go for help.

Looking for more causes
Be aware that there may be more than one cause of a problem. A problem such as a badly maintained air drill may be the cause of another problem such as an overworked air compressor. If you have not lubricated the air drill properly, or you used the wrong type or quantity of oil, this problem may lead to another in the compressor.

PART IV
FACT AND OPINION

*A **fact** is based on something that can be measured or proven.* When you can explain a statement based on solid information, you are presenting a fact.

> **Examples:**
> Aluminum, galvanized or cadmium plated steel nails are used for outside finish work to avoid rust.
>
> The Maple Leafs did not win the Stanley Cup last year.

*An **opinion** is based on an unproven belief.* When we base a choice on an opinion, we need to look closely to find our reasons for thinking the way we do.

Examples:
Fords are better than Hondas.

The Maple Leafs will win the Stanley Cup.

Know the difference
When you evaluate information, you need to look closely at your reasons for thinking the way you do.

Example: Are tools produced for professional use better than tools produced for ordinary use? In what ways? For which situations? Explain your answers.

If you can explain the answers to these questions by drawing on facts that support what you say, your answer will be true.

If you explain your answer by saying "I think " or "I heard that …", you are stating an opinion. It may or may not be true.

When someone tells you something is wrong with a finished product, they are probably giving you valuable information. It's your job to evaluate this information. Can you get reliable details about where and when the product failed, with an accurate description? Or, is it an opinion? Something like, "This bin doesn't seem like the other ones". In evaluating any situation, keep an open mind and ask questions and include information from a variety of quality sources.

Know your sources
Table 2, *The Trouble Shooting Guide*, is an example from a repair manual that includes directions to use *recommended* air pressures and *authorized* service centres.

It is important when you evaluate information to find out who wrote it. A maintenance manual provided by the manufacturer is a very reliable source. An article in a respected trade magazine is another. A chat room on the internet may not contain dependable information. *An important rule is to only use reliable sources to provide your information.*.

You will seek advice from experts and experienced professionals. But even the time-honoured practices of seasoned trades people come under occasional review that can lead to a new and better way of doing things. You need to learn and respect traditional methods but be open to new ideas. New and better ideas can only develop by someone carefully observing the actual relationship between cause and effect in the work site.

Language
Just as some words make a cause and effect relationship very clear, some words and phrases make rules and codes very clear. In some situations, the language tells you that there is no room for opinion.

Words such as *never, always, must (not), shall (not), are prohibited,* make it very clear that the information presented is not open to opinion, debate or evaluation. Your experience may not give

you enough information to understand or evaluate the reasons for every direction. The language tells you what to do; it tells you there is no decision-making necessary.

Examples:

Never work on scaffolding directly above another person.

Gasoline must never be used as a cleaning agent. It presents an extreme fire hazard.

Employees must wear approved safety equipment.

Never attempt to make repairs to extinguishers.

Always maintain and use tools properly. A defective tool is a dangerous tool.

Words like *should be, ought to, is recommended* and *make a reasonable effort,* offer suggestions or offer opinions. They offer advice that you will consider and evaluate. There may be some room for decision-making based on opinion:

Examples:

Tools should be good quality.

In many cases, two people should work together.

A metatarsal type safety shoe is recommended.

Make a reasonable effort to contain the fire.

In Brief

As you learn about your trade, make observations with a clear, open mind. Constantly conduct small experiments to test your ideas or materials. Assess your skill level in carrying out a project. What do you still need to learn? Based on your experiments and observations, you will learn to make evaluations based on useful facts, not haphazard options.

CONCLUSION

The steps in a procedure may be straightforward, but you still have to evaluate information as you make decisions about materials, equipment, costs and time or when you look for trouble spots. To solve most problems, you first need a clear understanding of how something is supposed to work. Through experience, you will discover causes of and solutions to problems. You will also learn to use experience to evaluate the effectiveness of each solution as you try it.

Materials, installation techniques, standards and codes are constantly changing in the construction trade. You have to keep up with these changes. You have to differentiate between someone's opinion and reliable facts. Check with inspectors, suppliers and manufacturers to learn about the latest products and information. Learn to recognize the relevance of the information you read by evaluating how it to your trade and to the job you are doing.

Sound decisions depend on knowing your sources and on your ability to take advantage of all the available resources. Information can come from written material, from lessons with experts and from your own experience. Learn to evaluate what you learn so you can choose the information that best fits the situation.

Summary

1. **Evaluate the situation from every angle** and choose information, products and rules that fit the job.

2. **Understand the relationship of the information in a table, diagram and the text.** Use it all and relate it all to what you are doing or learning.

3. **Assess your skills, experience, information, and how you are applying the information.** Evaluation is one of the best learning tools we have.

4. **Understand what cause is, and what effect is**. Work backwards to find cause and work forward to predict the effect, or the result. Your object is to prevent problems.

5. **Weigh the facts you have available and make appropriate choices at every step,**.

6. **Learn the difference between fact and opinion** .

ANSWER PAGE

PART I Passage 1, Seasoned Lumber

1. Seasoned lumber will be a better choice for doors, floors and drawers than unseasoned lumber.

   T The passage states that the dimensions of finished parts such as doors are affected by humidity. If dimensions change, performance will change. Doors may stick and gaps may appear between floorboards. Since seasoned lumber has reduced moisture content, this lumber should give you a more predictable result.

2. In typical Canadian homes, when would a carpenter expect wood to show most shrinkage?
   a) in winter

   This question asks you to evaluate conditions based on the passage and your knowledge of Canadian winter conditions. A typical Canadian home is heated by forced air, circulating heated water or electric radiators through the winter months. Heat removes moisture from the wood. Removing moisture causes shrinkage.

3. By referring to Passage 1, you could calculate the allowance needed for expansion and shrinkage in various types and grades of lumber.

   F Moisture content is reduced to levels specified for the grade and use of a wood, but the passage does **not** tell you what this level is or what allowance to leave. The right guide or chart will direct you to the correct allowance for various grades and uses.

4. Why would a builder or carpenter choose kiln drying over air-drying for green lumber?
   c) Kiln drying does not add defects.

   From Passage 1, you learn that air-drying can create additional defects in wood while kiln drying does not have this effect. Answers a) and b) are both true but they have an indirect bearing on the carpenter's choice

PART II Passage 2, Pitched Roofs

1. When ceiling joists support roof loads, the span will be approximately the same as when they do **not** support roof loads.

   F Because the passage doesn't give you the details, choose False. Only by consulting Table A could you determine if the span is *approximately* the same in the two situations.

2. By referring to Figure 1, you can identify the splice plates.

   T The caption below the figure says, "Ceiling joists butted with splice plates over centre bearing partition." If you look at the diagram, you can find the ceiling joists and the centre

bearing partition, which are both labeled. Where the joists meet over the partition, you see unidentified pieces joining, or splicing, the joists. By evaluating what you see in the figure and what you read, you can assume the pieces are splice plates.

3. Which topic below does Passage 2 give you the *least* information about?
   b) in which situations ceiling joists will support opposing rafters

   For each of topics a), c) and d), you get some information and where to find more (Tables A, B and C). For Answer b), you have no information about when or why ceiling joists would support opposing rafters, or where to find this information.

4. Passage 2 gives the sequence and nailing practice for normal pitched-roof framing.

   F You are given the sequence for ceiling joists: These are nailed in place *after* the interior and exterior wall framing is complete, but *before* the rafters are erected. You are told why to use this sequence: to prevent the thrust of the rafters pushing out. The passage does **not** tell you anything about the nailing practice or tell you where to find this information.

PART III Passage 3, Pneumatic Tool Maintenance
Table 2: Troubleshooting Guide for Air Drills

1. According to this passage, a tradesperson can avoid the common problems that cause air tools to malfunction or function badly.

   T Passage 3 lists the common causes of air tool malfunction. A tradesperson can avoid these. Furthermore, the passage states what to do if the tool is not functioning properly.

2. Rust will form in air tools for the following reason:
   c) tool is stored with water in it,

   This is the only cause listed for rust problems, although there may be others.

3. An air tool that requires more air pressure may cause damage to the air compressor.

   T This is a cause and effect. In this case, one problem may cause another problem.

4. The air flows freely from the exhaust in your air drill and the spindle turns, but your air drill does not run. According to Passage 2, which action below will **not** correct the problem?
   a) drying the water in it before storing,

   The answer is found in Table 2. Answer a) is the only solution not given for this problem. Eliminate wrong choices or actions to focus on the correct or most likely solutions. The right solution will eliminate or prevent this problem.