Program Hazard Analysis

For New, Modified, or Recognized Activities

10/20/2009 Revision and Update

This evaluation process is used to systematically identify, assess, and resolve hazards associated with program activities that support the vision, mission, and goals of the Boy Scouts of America. An analysis should be conducted for new program activities, for modifications to or expansions of existing activities, or for existing program activities with newly recognized hazards.

BOY SCOUTS OF AMERICA®

Program Hazard Analysis

Purpose

This evaluation process is used to systematically identify, assess, and resolve hazards associated with program activities that support the vision, mission, and goals of the Boy Scouts of America. An analysis should be conducted for new program activities, for modifications to or expansions of existing activities, or for existing program activities with newly recognized hazards.

Process

Define the Program Activities

The first step in the analysis process is to clearly, completely, and concisely define the physical and functional characteristics of the program activity to be analyzed. These characteristics should be presented in terms of the activity's equipment and materials, procedures, participants, and environment. Knowledge of how these elements interface with each other is essential to identify all potential hazards associated with the activity.

Define the scope of the program activity as clearly and concisely as possible. For example, analyzing "expanded use of pellet guns in a Webelos resident camp program" is both manageable and an efficient use of resources. Defining the program too broadly can lead to numerous tangential paths that are neither efficient nor effective. For example, "Cub Scout pellet gun shooting" is too broad a topic. The champion for the program is responsible for defining the scope of the program activity.

Identify Hazards

The second step in the process is to identify the hazards and determine their causes. Hazards can exist in many forms, including physical hazards such as an element of a facility or equipment design, chemical hazards, human error, and procedural hazards such as operating procedures that allow an action that causes an accident, injury, illness, or significant environmental damages.

Any of the five basic methods of hazard identification may be employed.

- Review data from previous accidents or existing operating experience.
- Develop a scenario and employ the judgment of experts.
- Use generic hazard checklists.
- Employ formal hazard analysis techniques. Examples include failure mode and effects analysis (FEMA), preliminary or operational analysis (PHA, OHA), and fault tree analysis (FTA).
- Review design data and drawings.

In this step, the whole universe of potential hazards must be identified and documented. Leadership should direct a cross-functional team or task force within the council to tackle this part of the process. Combinations of groups from program, management, camping, properties, health and safety, etc., tend to provide the best mix of expertise and operational experience for thorough hazard identification.

Assess the Identified Hazards

The third step in the process is to assess the identified hazards in terms of both the severity and consequence of each type of hazard and the probability of its occurrence. A classification system based on MIL-STD 882 system safety program requirements will be used as follows.

Hazard Severity

Hazard severity provides a qualitative measure of the worst credible result of the hazard. The following identifies the hazard severity categories that are used in this analysis and provides a definition for each.

Program Hazard Analysis – Hazard Severity Rating			
Category		**Industry Standard Description**	**BSA Relevance**
Catastrophic	I	Death, facility, or system loss or severe environmental damage.	Fatal or lifetime impairment, loss of sight or limb. Permanent facility loss. Events with multiple critical incidents. > $1 million financial impact.
Critical	II	Severe injury; severe occupational illness; or major facility, system, or environmental damage.	Temporary impairment requiring rehabilitation and/or lifetime partial impairment, loss of use of but not loss of a limb. Facility not a total loss but must be rebuilt or remediated. Events with multiple marginal incidents. < $1 million > $100,000 financial impact.
Marginal	III	Minor injury, minor occupational illness, minor system or environmental damage.	Injury requires physician to treat a temporary impairment, with complete rehabilitation possible. Sutures, clean fractures, injuries requiring transport to offsite medical facilities. Events with multiple negligible incidents. < $100,000 > $1,000 financial impact.
Negligible	IV	Less than minor injury or occupational illness, or less than system or environmental damage.	First-aid injuries not requiring medical professional intervention. < $1,000 financial impact.

Hazard Frequency

The probability that a hazard will be experienced during the planned life expectancy of the program or system can be estimated in potential occurrences per unit of time, events, population or activity. The following identifies the categories used and the definition of each.

Program Hazard Analysis – Hazard Frequency Rating			
Descriptive Word	**Level**	**Industry Standards Within Specific Individual Items, Fleets, or Inventories**	**BSA Relevance**
Frequent	A	Likely to occur frequently. MTBE* is fewer than 1,000 operating hours. Continuously experienced.	Expected to occur in a unit, district, council, program, or activity.
Probable	B	Will occur several times in the life of an item. MTBE is equal to or greater than 1,000 operating hours and fewer than 100,000 operating hours. Will occur frequently.	Will occur in the majority of councils conducting the program.
Occasional	C	Likely to occur sometime in the life of an item. MTBE is equal to or greater than 100,000 operating hours and fewer than 1 million operating hours. Will occur several times.	Likely to occur in a couple of councils/the program annually.
Remote	D	Unlikely but possible to occur in the life of item. MTBE is greater than 1 million operating hours and fewer than 100 million operating hours. Unlikely, but can reasonably be expected to occur.	Might happen once a year within the entire organization/program.
Improbable	E	So unlikely, it can be assumed occurrence may not be experienced. MTBE is greater than 100 million operating hours. Unlikely to occur, but possible.	Might happen once in the lifetime of the BSA.

** Mean time between events*

Risk Assessment

Once severity and frequency are established for a given hazard, a risk matrix can be used to decide whether to accept the risk or to implement hazard elimination or control measures.

Frequency of occurrence	Catastrophic (I)	Critical (II)	Marginal (III)	Negligible (IV)
Frequent (A)	**IA**	**IIA**	**IIIA**	**IVA**
Probable (B)	**IB**	**IIB**	**IIIB**	**IVB**
Occasional (C)	**IC**	**IIC**	**IIIC**	**IVC**
Remote (D)	**ID**	**IID**	**IIID**	**IVD**
Improbable (E)	**IE**	**IIE**	**IIIE**	**IVE**

Legend	Hazard Risk Index	Acceptance Criteria
	IA, IB, IC, IIA, IIB, IIIA	**Unacceptable**
	ID, IIC, IID, IIIB, IIIC	**Undesirable (decision required)**
	IE, IIE, IIID, IIIE, IVA, IVB	Acceptable with review
	IVC, IVD, IVE	Acceptable without review

After the hazards are evaluated, a resolution plan is developed based on an assessment of the risk associated with each hazard. There are essentially four choices in the hazard resolution process.

Unacceptable. For the most serious hazards (those with a rating of IA, IB, IC, IIA, IIB, or IIIA), controlling measures will be developed.

Undesirable. If the hazard is less serious (rating of ID, IIC, IID, IIIB, or IIIC), the hazard will be evaluated for corrective action and a decision will be made whether to correct or to accept the hazard.

Acceptable with review. The hazard resolution is closed based on an evaluation of the final risk, and the re-evaluation of the frequency and severity after the corrective action is included.

Acceptable without review. The least serious hazards are accepted as identified, and no corrective action is required.

Acceptance and Resolution of Risk

If a program or activity is deemed acceptable, the next step is to resolve identified hazards by implementing elimination and control measures to achieve acceptable risk. Identified unacceptable and undesirable hazards shall be eliminated or controlled using the following hierarchy of hazard resolution.

Design for Minimum Risk. Design, redesign, or retrofit to eliminate (i.e., design out) the hazards through design selection. If an identified hazard cannot be eliminated, reduce the severity and/or probability of occurrence to an acceptable level. This may be accomplished, for example, through use of fail-safe devices and principles in design, the incorporation of high-reliability systems and components, and use of redundancy in hardware and software design. Requiring the use of a single-shot bolt-action rifle instead of a semiautomatic magazine-fed rifle is an example of this concept, as is prohibition of an activity in its entirety (i.e., no parachuting as part of the program).

Safety Devices—Engineering Controls. Hazards that cannot be eliminated through design or controlled through design selection will be controlled to an acceptable level through the use of fixed, automatic, or other protective safety design features or devices. Examples of safety devices include interlock switches and protective enclosures. Care must be taken to ascertain that the operation of the safety device reduces the loss or risk and does not introduce an additional hazard. Safety devices will also permit the system to continue to operate in a limited manner. Provisions will be made for periodic functional checks of safety devices. A ground fault circuit interrupter (GFCI) on an outdoor circuit is an example of this concept.

Warning Devices. When neither design nor safety devices can effectively eliminate or control an identified hazard, devices must be used to detect the condition and to generate an adequate warning signal to correct the hazard or provide for personnel remedial action. Warning signals and their application will be designed to minimize the probability of incorrect personnel reaction to the signals and will be standardized within like types of systems.

Procedures and Training. Where it is not possible to eliminate or adequately control a hazard through design selection or use of safety and warning devices, procedures and training will be used to control the hazard. Special equipment operating procedures can be implemented to reduce the probability of a hazardous event, and a training program can be conducted. The level of training required will be based on the complexity of the task and minimum trainee qualifications contained in training requirements specified for the subject system element and element subsystem. Procedures may include the use of personal protective equipment. Precautionary notations in manuals will be standardized. Safety critical tasks, duties, and activities related to the system element/subsystem will require certification of personnel proficiency. However, without specific written approval, no warning, caution, or other form of written advisory will be used as the only risk reduction method for category I and II hazards. Examples of this within the current program include life jacket use during boating activities, the use of qualified trained supervision in shooting or climbing programs, and the initial safety requirements of merit badge pamphlets.

Follow-up

Once the hazard analysis is completed, it is the responsibility of the champion/originator to fully develop agreed-upon the identified elimination, control, warning, or training and procedures and to implement a system to monitor the measures being used. Should any additional hazards be recognized, it is the responsibility of the champion/originator to update the program hazard analysis to address these hazards.

Documentation

Keys to successful program hazard analysis include

- Use of a documented, systematic process for identifying, analyzing, and resolving hazards
- Integration of key stakeholders early in and throughout the process
- The ability to bring in subject matter experts as needed

Key stakeholders in the process who must always be included are Program Group, Risk Management, Health and Safety, and dependent upon the program, Legal representatives. The champion/originator of the analysis should be the stakeholder who defines the program to be analyzed. Typically, this would be a Program Group representative, but the originator could range from a council volunteer to the Chief Scout Executive.

The following forms/guides are offered to document the analysis process. The first is a narrative; the second is a program hazard analysis form. For simple program additions or modifications, abbreviated documentation is acceptable with stakeholder concurrence.

Narrative Example

Date: ***September 23, 2009***

Originator / Champion: _____
Representing Program Group: _____
Representing Legal Counsel: _____
Representing Risk Management: _____
Representing Health and Safety: _____

Detailed description of program to be evaluated:
Authorization for Boy Scouts to shoot small-bore rimfire .22 caliber repeater-type bolt action rifles with a minimum trigger pull of 3 pounds, and a clip-style magazine. (Tubular magazines are not approved). NEED TO CLARIFY— this will not include semi-auto actions as reviewed 9-23-09.

This is a new ***X*** modified ____ recognized ____ activity.

Describe or list advantages of the program.

- ***This would permit Boy Scouts to use modern firearms.***
- ***Councils would have more options for program equipment.***
- ***Council already have this equipment; this would allow for an optional use of a loaded magazine without the use of a single shot adapter.***

Describe or list disadvantages or problems associated with the program.

- ***Orienting councils, camp staff, and NCS faculty on new procedures.***
- ***Additional learning curve.***
- ***Need to manage magazines during clearance drill (add magazine out).***
- ***Additional wear on rifle / magazine interface, feeding issues.***

List the hazards associated with the program activities (complete PHA/OHA).

- ***Need to manage loaded magazines during ceasefires or clearance drills.***

List the impact to resources (additional or change).

- ***Possible purchase of new firearms.***
- ***Increased consumption of ammunition.***
- ***Additional orientation time for staff***

Identify publications or policies impacted.

- ***Merit badge pamphlets***
- ***Guide to Safe Scouting***
- ***NCS lesson plans***
- ***Shooting Sports manual (pending)***

Cost impact of proposed change (include council/district/unit costs):

- ***Not mandatory, no costs incurred if the council does not purchase new firearms.***

Scheduled impact of proposed change:

- ***None***

Describe the proposed effective date of change (e.g., When would the change go into effect?):

- ***Immediate implementation is acceptable. Update literature during regular revision process.***

Urgency of change:

- ***The majority of shooting sports literature is under review/revision. Approval at this time would streamline the process***

Program risks: Approved: _____ Rejected: _____ Accepted with controls as follows: _____

Signatures/concurrence: _____Date: _____

Narrative

Date: _____

Originator / Champion: _____
Representing Program Group: _____
Representing Legal Counsel: _____
Representing Risk Management: _____
Representing Health and Safety: _____

Detailed description of program to be evaluated:

This is a new ____ modified ____ recognized ____ activity.

Describe or list advantages of the program.

Describe or list disadvantages or problems associated with the program.

List the hazards associated with the program activities (complete PHA/OHA).

List the impact to resources (additional or change).

Identify publications or policies impacted.

Cost impact of proposed change (include council/district/unit costs):

Scheduled impact of proposed change:

Describe the proposed effective date of change (e.g., When would the change go into effect?):

Urgency of change:

Program risks: Approved: _____ Rejected: _____ Accepted with controls as follows: _____

Signatures/concurrence: _____Date: _____

Program Hazard Analysis – New, Modified, or Recognized Activities

Date:	**2/25/2008**						
Program:	**(EXAMPLE) Cub Scouts**						
Description:	(EXAMPLE) Addition of Pellet Gun / Air Rifle Shooting to Cub Scout Resident Camp Programs						
	Hazard Cause / Effect			Corrective Actions			
Hazard Description	Cause	Effect	Initial Risk Rating	Possible Controlling Measure	Closing Comments	Status	Final Risk Rating
High velocity pellets strike participants and onlookers.	Use of BB gun range or backstop.	Pellets leave safe range area.	ID*	Conduct the events only at appropriate range or with backstop and pellet trap designed for air rifles.	Accept NRA recommendations		IID
Same	High velocity and hunting rifles used.	Pellets leave safe range area.	ID	Limit air rifle velocity (500-540 fps) and energy levels (7.5 joules)	Accept NRA recommendations.		
Same	Financial pressures or donated air rifles used that don't meet standard	Pellets leave safe range area.	ID	Clearly define pellet gun as single shot designed for target shooting, trigger pull requirements and accept no substitutes (current examples Daisy 853, 888 (ODCMP) Crossman 2000) Limit air rifle velocity (500-540 fps) and energy levels (7.5 joules)	Consistent with Boy Scout rifle shooting.		

* Example Worst Case – loss of sight – Happening once a year in the organization.

BOY SCOUTS OF AMERICA®

Program Hazard Analysis – New, Modified, or Recognized Activities

Date:							
Program:							
Description:							
	Hazard Cause / Effect			Corrective Actions			
Hazard Description	Cause	Effect	Initial Risk Rating	Possible Controlling Measure	Closing Comments	Status	Final Risk Rating