



**The Environmental Management Skill Set:
A balance between engineering/science and management.**

Workshop Summary

Scott Wolcott, PE

Overview

The workshop was moderated by RIT Professor, Scott Wolcott and attended by environmental management professionals from Croatia, ACMT faculty and graduate students. The proposed agenda for this workshop was developed based on work completed at the 2nd Environmental Management Leadership Symposium (EMLS) held at Corvinus University in Budapest, Hungary on June 23 and 24, 2008.

The goal of “The Environmental Management Skill Set” workshop is to identify the appropriate balance of skill sets an environmental manager should possess. Some say that a good environmental manager needs to be a good business manager with a little scientific and technical environmental knowledge. Others believe that a lack of technical or scientific skills might render an otherwise great business manager ineffective when working in the environmental arena. A good environmental manager would know how to get things done in the organization and what specific questions to ask and how to work with specialists to determine the most effective and efficient solution.

Specifically, the questions we wanted to ask and answer were:

1. What is an appropriate balance of skills?
2. What, at a minimum, is specifically needed on each side of this balance?
3. Based on this balance, what should undergraduate curriculum contain to prepare students for a career in environmental management?
4. How would the resulting minimum skill set affect possible future credentialing of environmental managers?

Workshop Results from 2nd EMLS (Budapest, Hungary)

The first item addressed was identifying beneficial skill sets an engineer/scientist and business manager might possess. The following table presents the results of this discussion.

Table 1 - Skill Sets

Engineer/Scientist	Business Manager
<ul style="list-style-type: none"> • Problem solving • Curiosity • Application • Determination/dedication, Persistence, Focused <ul style="list-style-type: none"> ○ Disadvantage – works in isolation • Analytical skills • Ability to combine multiple knowledge bases into a single solution - Holistic problem solving • Stepwise process • Communication of problems and solution 	<ul style="list-style-type: none"> • Communication • Good organization <ul style="list-style-type: none"> ○ Self ○ Of task for others ○ Delegation of tasks/others • Balance between delegation of duties & sensitivity towards others <ul style="list-style-type: none"> ○ Good human resource skills • Strategic thinking • General overview of “department” and how it “fits” into system (holistic view). • Understanding strengths and weaknesses of staff • Determination/evaluation of advantages and disadvantages of decisions • Dedication • Problem solving with cool demeanor • Disadvantage – lack of specific knowledge

Please note that skill sets in **BOLD** were added at the 3rd EMLS.

Twenty-two activities that typical environmental managers would be required to perform, were identified and assessed (See Table 2) at the 2nd EMLS. Attendees, as a group, decided if the activity would be completed by an environmental manager using either business manager skills, engineer/scientist/technician skills or both. This assessment was then weighted by the frequency of the activity (1 to 5, with 5 the most frequently performed).

Table 2 – Environmental Manager Activities

1. **developing environmental strategies that ensure corporate sustainable development;**
2. **leading the implementation of environmental policies and practices;**
3. **coordinating all aspects of resource use, pollution reduction, waste management, environmental health, risk assessment and employee involvement;**
4. **ensuring compliance with environmental legislation;**
5. **developing pollution control, pollution prevention and recycling programs;**
6. **auditing and reporting on environmental performance to internal and external clients and regulatory bodies;**
7. **identifying, assessing and reducing an organization’s environmental risks and financial costs;**
8. **keeping abreast of environmental legislation and good practice;**
9. **raising awareness, at all levels of an organization, of the impact of emerging environmental issues, whether legislative or best practice, on corporate, ethical and social responsibility;**
10. **managing the development and implementation of an environmental management system;**
11. **bidding for and managing the budget of an organization’s environmental strategy;**
12. coordinating public hearings and consultations on environmental matters;
13. **managing relations with the board of directors, senior management and internal staff;**
14. **training staff at all levels in environmental issues and responsibilities;**
15. **developing and implementing marketing and sales strategies for environmental goods and services;**
16. developing business opportunities;
17. managing a diverse group of engineers, scientists and technologists;
18. negotiating environmental service agreements and managing associated costs and revenues;
19. writing environmental reports;
20. leading on corporate social responsibility issues and action;
21. maintaining regular contact with regulatory bodies; and
22. Combining environmental management with other regulatory responsibilities, such as quality and safety.

Please note that activities in **BOLD** were assessed at the 3rd EMLS.

The resulting balance of skills sets: 71 percent business manager and 29 percent engineer/scientist/technician were accepted by most at the symposium. However, one session attendee believed the environmental manager tasks assessed were biased towards the business manager skill set. An importance weighting factor was dropped during the workshop, because all activities were considered as very important.

Workshop Results from 3rd EMLS (Dubrovnik, Croatia)

Based comments and results from the 2nd EMLS, the list of environmental manager activities was reviewed and modified in order to eliminate the bias of too many business manager activities. The list was expanded from 22 activities to 32.

The primary assessment involved determining if the activity would be completed by an environmental manager using all business manager skills, mostly business manager skills, both skill sets equally, mostly engineer/scientist/technician skills or all engineer/scientist/technician (EST) skills. This assessment was then weighted by the frequency of the activity (1 to 5, with 5 representing most frequently performed). An importance weighting factor was reintroduced in two contexts. The first importance weighting factor (1 to 5, with 5 the most important) was related to regulatory compliance. The second was related to creating or maintain a sustainable society (1 to 5, with 5 the most important).

Fifteen people attended the workshop. Only 16 of the planned 32 activities were assessed because of time constraints. The results indicated that environmental managers would use 52% business manager skill sets and 48% of skill sets typically associated with ESTs to complete the activities considered during the workshop. If the focus of the activities was regulatory compliance the balance shifted towards the EST skill sets by approximately 1% (51/49). If the focus of the activities was “sustainable society” the balance shifted towards the business manager skill sets by approximately 2% (54/46).

Detailed results of the assessment are available upon request. Please contact Professor Wolcott at sbwite@rit.edu.

Conclusions and Recommendations

The fact that only 16 activities were assessed in a 60 minute period was disappointing. However, the discussion that resulted from the process was passionate and interesting. In any event, the results of the 2nd and 3rd symposia are very different.

One reason the skill set balances were different could be that the activities assessed at each symposium were not the same. However, 14 of the 16 activities assessed at the 3rd EMLS were also assessed at the 2nd symposium.

If only the common 14 activities are considered, the balance of skill sets at the 2nd EMLS becomes 67% business manager and 33% EST. This is closer to the balance determined at the 3rd EMLS (52% BM/48% EST). If only the common 14 activities are considered, the balance of skill sets at the 3rd EMLS remains becomes slightly more skewed towards business manager skill sets (55% BM/45% EST).

Another possible reason for the different balance is that the majority of the attendees of the skill set workshop at the 2nd EMLS symposium were naturally biased towards a business manager perspective. The 2nd EMLS symposium was held at Corvinus University at Budapest which administers the environmental management graduate programs from the College of Economics. Polltakers have a name for this affect on surveys. It's called "selection bias".

The 3rd EMLS assessment was recently distributed at the EHS executive leadership session held at RIT. 15 individuals completed the assessment. The results have not been compiled.

It is recommended that the assessment structure presented at the 3rd EMLS be distributed to a larger population. This will be achieved through a web-based survey and include demographic questions for later analysis.

The skill set balance assessment will probably not be performed at the 4th EMLS, which will be hosted by RIT in May 2009. Hopefully, sufficient information will be collected from the web-based survey to produce meaningful results. Instead, attendees of the EMLS will be invited to attend a workshop addressing the next question - *What, at a minimum, is specifically needed on each side of this balance?*