

Online Reverse Bid Auctions in the Construction Industry: A Review of Application Information and Savings Data

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The online reverse auction (OLRA) method has become a popular tool for purchasing commodities in the last decade. Increasing numbers of companies have entered the construction business scene providing internet services and auction tools with claims of vast dollar savings. With the motivation of seeking lower costs, several owners started using the method for their construction services. The method, however, is raising concerns within the construction industry from contractors, subcontractors, construction managers and design professionals. The expressed worries include legal issues, encouragement of imprudent bidding, devaluation of relationships within the construction process, and misperceptions of lowest price guarantees and cost savings. There are concerns about the ethical issues and responsibilities of the parties involved in OLRA such as issues of bid shopping, system integrity and trust in general. To analyze the impacts of OLRA for the construction industry, the first step is to review information and data on the method to understand the application areas, mechanics and outcomes. This paper presents a review of OLRA applications with specific focus on published/recorded cost and savings information.

Keywords: reverse auctions, bidding methods, bid shopping, OLRA

Introduction and Background

The online reverse auction (OLRA) method has become a popular tool for purchasing commodities in the last decade. The lure of cost cutting has caused some owners and service (software) providers to extend this method into the area of construction services. Increasing numbers of companies have entered the construction business scene providing internet services and auction tools with claims of vast dollar savings. With the motivation of seeking lower costs, owners, both private and public, have responded and begun to create programs for experimentation with OLRA [Tuchman, 2003]. Some owners have applied the method with full corporate commitment. There are case reports of cost savings (focused on commodities) from 5% to 90% through OLRA [Beall et al., 2003].

The method, however, is raising concerns within the construction industry from contractors, subcontractors, construction managers and design professionals. The expressed worries include legal issues, encouragement of imprudent bidding, devaluation of relationships within the construction process, and misperceptions of lowest price guarantees and cost savings [Angelo, 2002, ASA, 2003, AGC, 2004]. Contractors, subcontractors, construction managers, design professionals, owners and other service professionals also express worries about the ethical issues and responsibilities of the parties involved in OLRA such as issues of bid shopping, system integrity and trust in general [ASA, 2003 and Doran, 2004].

It must be pointed out that OLRA is but a method that is used within the construction system to move a concept idea to a finished, full dimensional, operational project as envisaged by the concept. The construction system flows from the point of project conception through planning, financing, design, contractor/subcontractor activities (prequalification, bidding, selection, contract formation, contract execution, contract administration, required legal approvals, substantial completion, completion and in some cases operation and maintenance). The system also includes manufacturers, suppliers, and distributors of any required material or resource. To truly determine the success or detriment of a particular method introduced into a system, clear understanding and full appreciation of the system functions and relationships are required. This includes the obligations and duties of the parties, both ethical and contractual, at each interrelated element of the system. Any modification in the system may influence the cost and relationships, and may result in ethical and/or legal problems. Therefore, to state that a change in the competitive bidding method within the construction system is ethical, fair or beneficial to the parties, a complete review of the construction system and the impact analysis of the modification are required. The first step in such an analysis is to review information and data on the OLRA method to understand the application areas, mechanics and outcomes.

This paper presents a review of OLRA applications with specific focus on published/recorded cost and savings information. The paper includes the summary of the findings of the first phase of a research project entitled “Online Reverse Bid Auctions for Construction Contractors and Subcontractors.” The project was structured as a two-phase study executed over two years (2004 to 2006). The first phase of the project included the collection of existing data, information, and documentation on OLRA method. As a part of the first phase, a working bibliography on online reverse auctions was prepared and deployed online, open to contributions for data, experiences and comments. The second phase of the study analyzed the impacts of OLRA method on the construction system including legal and ethical issues.

Collection of Existing Materials and Data

The published data and information were collected using a two-layer search methodology. The first layer included the scientific publication databases and web based search engines. The collected materials from the first layer were then reviewed for any additional cited materials and references as the second layer of the search.

As a part of the first layer search, 36 scientific publication index and databases were searched for four keywords: reverse auction(s), reverse bidding, e-bidding, and e-auctions. It should be noted that some of the indexes listed search more than one scientific database. 17 web based search engines were also used as a part of this search layer. The four keywords used for the scientific databases were also used for the web-based search. Although there is a high percentage of overlap in the search results using different search engines, multiple search engines were used in this process to capture any original material.

The collected materials from the first layer were filtered for any overlapping and irrelevant materials. A second layer search of the filtered list was conducted for any additional cited

materials or references. The results of the material search were compiled in a bibliography. In 2004, there were 301 documents listed in the bibliography as reported in the first phase of the study. During the second phase of the study, the number of documents in the bibliography increased to 336 with the addition of the newly published and/or listed materials.

Development of Online Working Bibliography

An online working bibliography was created as a part of the project that contains the bibliography prepared in Phase I. The working bibliography was initially housed at the Louisiana State University Servers (2004-2006). In 2006, an updated version of the bibliography is created at Texas A&M University servers, available at olra.tamu.edu.

Currently, the working bibliography contains 336 items hyperlinked to the original document, abstract and/or publisher's web page. Because of the copyrighted and protected materials, some of the items could not be hyperlinked to the original document. Some of these documents require free registration or subscription through the provider's web page.

The online working bibliography is prepared to not only share the wealth of collected information but also create an opportunity to enrich the bibliography through contributions. The following information and messages are included in the web site to define and map the content, and acceptable contributions emphasizing the focus of the bibliography, published information and data:

“The focus of the working bibliography is published information and data. For the purposes of this study, published information and data include:

- Scientific Journal Publications
 - Reference Info: Author(s), year, title, journal name, volume, issue no, page no, publisher, web reference (if available)
- Conference/Convention Proceedings and Presentations
 - Reference Info (proceedings): Author(s), year, title, conference/ convention name, location, volume, issue no, page no, publisher, web reference (if available)
 - Reference Info (presentations): Author(s), year, title, conference/ convention name, session, web reference (if available)
- Scholarly Materials (Thesis, Dissertation, Center Reports, etc.)
 - Reference Info: Author(s), year, title, institution name, web reference (if available)
- Materials from Legal Sources (Case Decisions, Legal Articles, etc.)
 - Reference Info: name/title, year, source, web reference (if available)
- Trade Journal, Magazine, and Newspaper Articles
 - Reference Info: Author(s), year, title, journal/magazine/newspaper name, volume, issue no, publisher, web reference (if available)
- Organizational Newsletters, News Releases, Policy Statements, White Papers
 - Reference Info: Author(s), year, title, organization name, publisher, web reference (if available)
- Published Data and Case Studies

- Reference Info: Author(s), year, title, organization name, publisher, web reference (if available)

Any information, which may be considered confidential information between other parties, will not be accepted for the working bibliography. Information of an advertising nature (flyers, product brochures, etc.) will not be included in the working bibliography.”

For the ease of navigation and searching, the bibliography is created on a single page. The hyperlinked items open a new window and show the document separately from the bibliography page. The page is designed to be viewed by any browser and for screen sizes equal to or greater than 800x600 resolution. The bibliography is sorted alphabetically, separated by each letter.

Summary of Findings and Observations

Online reverse auctions, also known as electronic reverse auctions, e-bidding, and reverse bidding, can be defined as [Beall et al., 2003]:

“In its basic form, an e-RA (electronic reverse auction) is an online, real-time dynamic auction between a buying organization and a group of pre-qualified suppliers who compete against each other to win the business to supply goods or services that have clearly defined specifications for design, quantity, quality, delivery, and related terms and conditions. These suppliers compete by bidding against each other online over the Internet using specialized software by submitting successively lower priced bids during a scheduled time period. This time period is usually only about an hour, but multiple, brief extensions are usually allowed if bidders are still active at the end of the initial time period.”

This definition, very likely the most comprehensive definition among the collected materials, includes two key issues that characterize the OLRA method. The first issue is the area of application and the procedure defined as “...to win the business to supply goods or services that have clearly defined specifications for design, quantity, quality, delivery, and related terms and conditions.” The definition does not distinguish between procurement of goods and of services. This approach of combining goods and services can be observed through the bibliography on both reporting of savings and technology applications.

The second issue is the application of OLRA services defined as “... compete by bidding against each other online over the internet using specialized software.” The specialized software and internet services are defined as a requirement, which in fact is the driving marketing force behind the OLRA applications.

Observed Areas of Application

The collected documentation contains several specific applications for reverse auctions in commodity and service areas. These include (with sample references):

- Airline tickets [Cohen, 2005]
- Office supplies and furniture [Jackson, 2004]

- Computers and computer related applications [AFPN, 2000]
- Specific machine parts [Beall et al., 2003]
- Raw materials for manufacturing [Emiliani and Stec, 2001]
- Cost of utilities [EPM, 2005]
- US Government Treasury transactions [WSJ, 2002]
- Surgical operations [Schafernak, 2001]
- Legal services [BTI, 2003]
- Construction services [Angelo, 2002]

The list of the application includes eight commodity and three service applications. While the commodity applications vary from airline tickets to raw materials for manufacturing, the service area applications include surgical operations, legal services and construction services.

OLRA Technology, Service and Applications

The collected materials contain a number of technology related information and possible applications of the OLRA technique. The common advantages listed in these documents include OLRA's ability to reach to global markets and the marvels of the IT platforms that uses OLRA as their purchasing tool. The savings are generally reported in averaged percentage form without providing the aggregated/itemized data. In other words, although the OLRA technique is defined and advertised as a tool for both procurement of commodity and of services, specific data on service applications are not reported but averaged with commodity applications. Overall, the OLRA technique is introduced as a "miracle tool" for cost savings that can be applied to any and every procurement need that a company might have [Emiliani and Stec, 2002].

Another general observation from the collected materials is that whenever the services for information technology and procurement tools are marketed, the concept of online bidding is always merged with the reverse auction technique. Although the "online" and "reverse auction" parts of the OLRA technique are two independent technology/methods, the approach from the service providers is to market the product as one package.

The concept of cost saving also had an effect on the technology and service providers when the companies begin to realize the investment required for and the cost of services paid to the provider. The "high" cost of using the OLRA service/software packages resulted in a new and simpler product where the companies only buy the "do-it-yourself" software package from the technology providers and design, prepare, and conduct the bidding with their internal resources [Beall et al., 2003].

Federal and local government institutions use the OLRA technique frequently for commodities and recognize the OLRA as a "valuable tool as an e-procurement resource" in their procurement toolbox. It should be noted that the federal, state and military institutions use and recognize the value of the OLRA technique for commodities. However, the use of OLRA for construction services is not recommended by the Army Corps of Engineers in the only study that is conducted in the construction services area [Castaldo, 2004].

Concerns and Reservations about OLRA

There are a number of documents in various categories that reflect concerns and reservations about the use of OLRA. These concerns address a wide range of issues including the mechanics of the OLRA technique and the concerns related to the application areas. The issues related to the mechanics of the technique include “phantom bidders”, “birdwatchers”, “divers” and relationship impacts in general.

In addition, the issues specific to the OLRA and construction services have been addressed by almost every national construction trade organization in various platforms. The trade organizations usually address the OLRA related issues and concerns through policy statements or white papers. For example the Associated General Contractors of America stated the following in its white paper on “Reverse Auctions for Procurement of Construction” which also was endorsed by the Associated Specialty Contractors [AGC, 2004]:

“...However, AGC believes that reverse auctions are an unproven method for selection of construction contractors, specialty contractors, subcontractors, and suppliers. At best, reverse auctions raise significant issues for owners and construction team members, including the following:

- Reverse auctions do not guarantee the lowest price.
- Reverse auctions may encourage imprudent bidding.
- Negotiated procurements allow thorough evaluation of value.
- Sealed bidding assures that the successful bidder is responsive and responsible.
- Reverse auctions may contravene federal procurement laws and certain state laws.”

Similarly, the Construction Management Association of America noted the following concerns in its “Statement on Electronic Reverse Auctions for Construction and Construction Management Services” [CMAA, 2004]:

“To the potential detriment of a project, reverse auctions for construction and construction services eliminate the consideration of any qualifications except price. Because bidders are aware of their competitors’ bids, they may focus on the need to “beat” the most recent low price rather than making a thoughtful and deliberate evaluation of their own capabilities, qualifications, and price. The result can be imprudent bidding, which may lead to a contractor taking exceptional risks where they may be responsible for delivering a job at an unrealistic price—possibly for a price that falls below their costs.”

Research Efforts and Published Cost Savings Data

The majority of research efforts concentrate on development, implementation and optimization of the method from technical and technological perspectives. Although the discussion of the usage, calculation of savings, principles of application, ethical issues, and advantages/disadvantages are noted in a few publications (for example Hatipkarasulu and Gill, 2004, Jap, 2003, Beall et al, 2003, Emiliani and Stec, 2002), these effort are limited.

There are reported applications with proven cost savings when the OLRA technique is used for procurement of commodities. However, the cost savings reported in these applications are limited to certain types of commodities. In other words, the data does not support the claim of cost savings for all commodities.

Among the collected material, several case studies include aggregated data and/or analysis of cost savings. These can be listed as:

- CAPS Research Reports (GSK Case, Bechtel Case, Volkswagen Case, Metro Case and Japanese Purchasing Practices) [Beall et al, 2003]
- Center for Lean Business Management (several industries and cases) [for example Emiliani and Stec, 2004 and 2005]
- Governmental and Military Purchasing Reports (multiple reports in similar format)
- US Army Corps of Engineers Pilot Program for Construction Projects [Castaldo, 2004]

The first two bullets listed above include cost savings data on procurement commodities for different companies. Reported data include raw and/or comparative figures for a variety of commodity applications. Reported data can also be found in purchasing reports from governmental and military sources such as computer and stationary material purchases. These reports usually concentrate on specific commodities and/or limited types of applications. Aggregated cost savings data are not included in any of these case studies. However, it is interesting to note that even the commodity case studies recognize that there are differences between “biddable” and “auctionable” items.

There is only one case study conducted in the construction services area: the US Army Corps of Engineers Pilot Program on Reverse Auctioning. This study includes the data, training efforts, and analysis of OLRA technique for the eleven construction projects throughout the United States. As a conclusion, the final report determines that there is no proof that the use of OLRA provides cost savings for construction services. Furthermore, it notes that there is no valid method of measurement for such calculation [Castaldo, 2004].

Overall, within the collected documents and specific case studies, there is no proof of cost savings for construction services with the use of OLRA method.

Observations and Comments Received from the Industry

Since 2004, the study attracted attention from the industry through the efforts of working bibliography web page and discussions at different platforms. These efforts created an opportunity to collect observations and comments about the experiences and opinions of the industry.

The online bibliography web page received several comments from the industry; however, there were no data sets that show any kind of saving for construction services. A few comments that claim cost savings turned out to be for material purchases rather than the construction services. It is interesting to note that the information presented in the web page help with discussions of ethics and development of code of ethics for an international professional organization.

The research efforts also extended to several industry presentations and discussion panels on reverse auctions. This made it possible to communicate the findings of the study while creating an opportunity to observe industry experiences with OLRA method [for example; AIC, 2006 and ICIC, 2006]. Although the industry experiences and opinions of OLRA method were not positive in general, there were also several positive comments. These comments were from OLRA participants that started the auction with a high number, knowing that they have to reduce the number during the process, and did not have to reduce their prices because of the lack of competition. In other words, they have received the jobs for higher prices than their lowest price which would have been used in a traditional bid process.

Another comment was that the quality of the project documentation has improved since the method generally utilizes digital distribution of the documents. However, this comment highlights need for improving the quality of documentation and communications within the construction system regardless of the bidding method. Clear and comprehensive documentation and proper communication would minimize risks and ambiguity resulting in better prices.

Conclusion and Discussion

In the last decade, the OLRA method has gained interest as a procurement tool for both commodity and service applications with the advancement and aggressive marketing of online technologies. The marketing approach for the method is to promote OLRA as an online technology that will provide cost and time savings regardless of the application area. However, as of today, there is no published proof of savings for OLRA applications when used for construction services. The only research effort on OLRA for construction services concluded that it offers "no factual, significant or marginal savings" over the traditional methods [Castaldo, 2004].

When technologies such as OLRA are introduced into a system, it is crucial to analyze its effects (both short and long-term) considering the properties, flow and relationships of the system. Such analysis has not been conducted for construction services; instead, a limited number of commodity applications were used as the proof of concept. This approach naturally leads to the argument that there is no difference between procurement of commodities and services. In addition, the concerns of potential "phantom bidders" and "birdwatchers" exist with any OLRA system since the identities of the bidders are not revealed. These concerns drastically increase with the availability of do-it-yourself packages that makes it possible to conduct OLRA sessions in-house.

This paper presents a review of application information and data on the OLRA method which was the first phase of a two-phased research project. The second phase of the project concentrates on the impacts of the OLRA method on the construction system. This includes the analysis of impacts on the construction system flow and relationships. Legal and ethical issues related to the OLRA applications are also discussed as a part of the second phase.

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References

ABC (2005). "Issues: Reverse Auctions" *Government Affairs*, Issues Section, Associated Builders and Contractors, Arlington, VA. Available at www.abc.org. Last accessed December 2006.

AFPN (2000). "New Reverse Auctioning Tool Saves Air Force 27 Percent on Computers." *FDCH Regulatory Intelligence Database*, Item: 32W20009200002199, Aug 10, 2000, eMediaMillWorks, Inc., Washington, D.C.

AGC (2004). "White Paper on Reverse Auctions for Procurement of Construction." *The Associated General Contractors of America*, Alexandria, VA.

AIC (2006). "Is Construction A Commodity? Pros and Cons of Reverse Auctions." Panel Discussion, *American Institute of Constructors Annual Meeting 2006*, Chicago, IL.

Angelo (2002). "Reverse Auctions Raise New Specter of Bid Shopping on Industry Projects." *ENR: Engineering News-Record*, Vol. 249, Issue 19, p34-37, 08919526, 11/4/2002, McGraw-Hill Companies, Inc.

ASA (2003). "Business Ethics Mean 'Reverse Auctions' Must Stop." Press Release, February 2004, *American Subcontractors Association*, Alexandria, VA.

ASC (2004). "ASC Endorses AGC Statement on Reverse Auction Bids." New Release, January 2004, *Associated Specialty Contractors, Inc.*, Bethesda, MD.

Beall, Carter, Carter, Germer, Hendrick, Jap, Kaufmann, Maciejewski, Monczka, and Petersen (2003). "The Role of Reverse Auctions in Strategic Sourcing." *CAPS Research Report*, Center for Advanced Purchasing Studies, Arizona State University, Temple, AR.

BTI (2003). "New Survey Reflects Growing Trend: Clients Increasingly Negotiate Rates with Law Firms." *Of Counsel*, July 2003, Vol. 22, Issue 7.

Castaldo (2004). "Final Report Regarding the US Army Corps of Engineers Pilot Program on Reverse Auctioning." Office of the Principal Assistant Responsible for Contracting (PARC), *U.S. Army Corps of Engineers*, Washington, DC.

- Cohen (2005). "BA Supplement-Travel-Going, going, gone." *Financial Director*: 9, March 01, 2005, VNU Business Media Europe.
- Davis (2000). "Reverse Auctions Give Consumers the Negotiating Power They Truly Desire." *InfoWorld*, 10/30/2000, Vol. 22 Issue 44, p88, 1p, Infoworld Publishing Group
- Doran (2004). "*Survey of Construction Industry Ethical Practices.*" FMI Corporation, Raleigh, NC
- Emiliani and Stec (2001). "Online Reverse Auctions for Purchasing Contracts." *Supply Chain Management*, Vol. 6, Issue 3, p. 101-105, Supply Chain Management – An International Journal.
- Emiliani and Stec (2002). "Realising Savings from Online Reverse Auctions," *Supply Chain Management*, 7(1), 12-23. Supply Chain Management – An International Journal.
- Emiliani and Stec (2004). "Aerospace parts suppliers' reaction to online reverse auctions." *Supply Chain Management*, Vol. 9, Issue 2, p. 139-153, Supply Chain Management – An International Journal.
- Emiliani and Stec (2005). "Wood pallet suppliers' reaction to online reverse auctions." *Supply Chain Management*, Vol. 10, Issue 5, p. , Supply Chain Management – An International Journal.
- EPM (2005). "Maryland reverse energy procurement saves \$5 million." *Energy & Power Management*, 30 (9): 29, September 2005, Business News Publishing Co
- Hatipkarasulu and Gill (2004). "Identification of shareholder ethics and responsibilities in online reverse auctions for construction projects." *Science and Engineering Ethics*, 10/2, pp. 283-288.
- ICIC (2006). "World of Ethics and Reverse Auctions." Panel Discussion, International Construction Innovations Conference 2006, Peoria, IL.
- Jackson (2004). "'Reverse auction' likely to save Pa. millions on office supplies." *The Associated Press State & Local Wire*, February 27, 2004, BC cycle, Associated Press.
- Jap (2003). "An Exploratory Study of the Introduction of Online Reverse Auctions," *Journal of Marketing*, Vol 67, No 3, pg.96-107.
- Schafernak (2001). "Letters to the Editor - Surgery by the Lowest Bidder?." *American Surgeon*, Jan2001, Vol. 67 Issue 1, p103-105 Southeastern Surgical Congress.
- Tuchman (2003). "Owners Are Pressuring Industry for Reverse Auction Bids." *ENR: Engineering News-Record*, 11/3/2003, Vol. 251 Issue 18, p11, 2/3p, 2c; McGraw-Hill Companies, Inc
- WSJ (2002). "Treasury Completes Reverse Auction to Buy Back Issues." *Wall Street Journal - Eastern Edition*, 4/19/2002, Vol. 239 Issue 77, pC12, Dow Jones & Co., Inc